



Photo : Sgt Norm McLean, Combat Camera - DND ref.: IS2013-0004-6464



Developments in .50cal Short Range Training Ammunition

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Outline

- ▶ Key Customer Requirements
- ▶ .50 cal SRTA Main Design Drivers
- ▶ Development Update for .50cal SRTA
- ▶ Performance
 - Design Changes
 - Test Data
 - Tracer Perform Update
- ▶ Applications and Benefits
- ▶ Summary



Key Customer Requirements



▶ .50 Cal SRTA Voice of Customer

- Projectile Must not make use of any recoil amplifiers and/or buffer devices
- Surface Danger Zone (SDZ) requirements have precedence over ballistic match
- Projectile should not exceed 700m (Objective) and 1000m (Threshold).
- Projectile should provide effective training range up to 300m \pm 50m on identified targets
- Should have similar functionality/reliability/availability /maintainability/ barrel wear performance as in service .50cal ball
- Tracer Projectile should be visual throughout the useful training range
- Yaw at target not an issue.
- Projectile must sink when fired over water



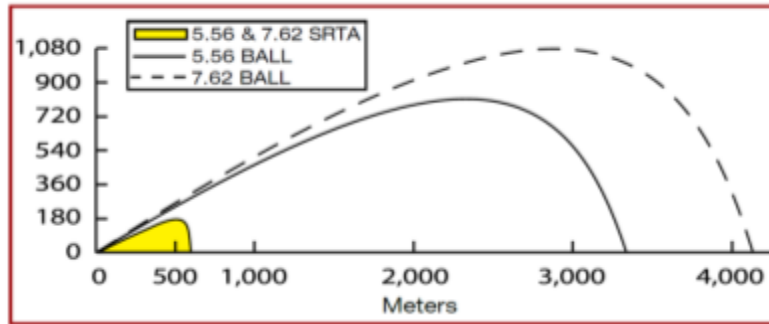
Full Family of SRTA Products

SHORT STOP[®] 7.62 mm and 5.56mm SRTA

- ▶ 7.62 mm SRTA Available in 4B/1T and ball only configurations
- ▶ 5.56mm SRTA available in clipped and/or linked configurations
- ▶ Both calibers in production for US DoD



Trajectory analysis



SHORT STOP® .50cal SRTA Development

▶ .50 cal SRTA Main Design Drivers

- No modifications of M2 machinegun
- Reliable functioning from -20 to $+50^{\circ}\text{C}$
- Lead free frangible/polymer projectile
- Max range of approx 700 m in priority to ballistic match
- No splashback beyond 25 m (Target at 50m)
- Improved ballistics and performance over M858 & M860 (T)



GD OTS C
.50cal SRTA (V1)

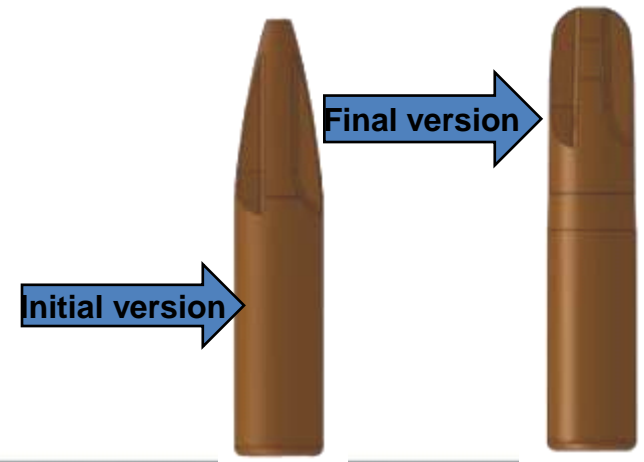


M858



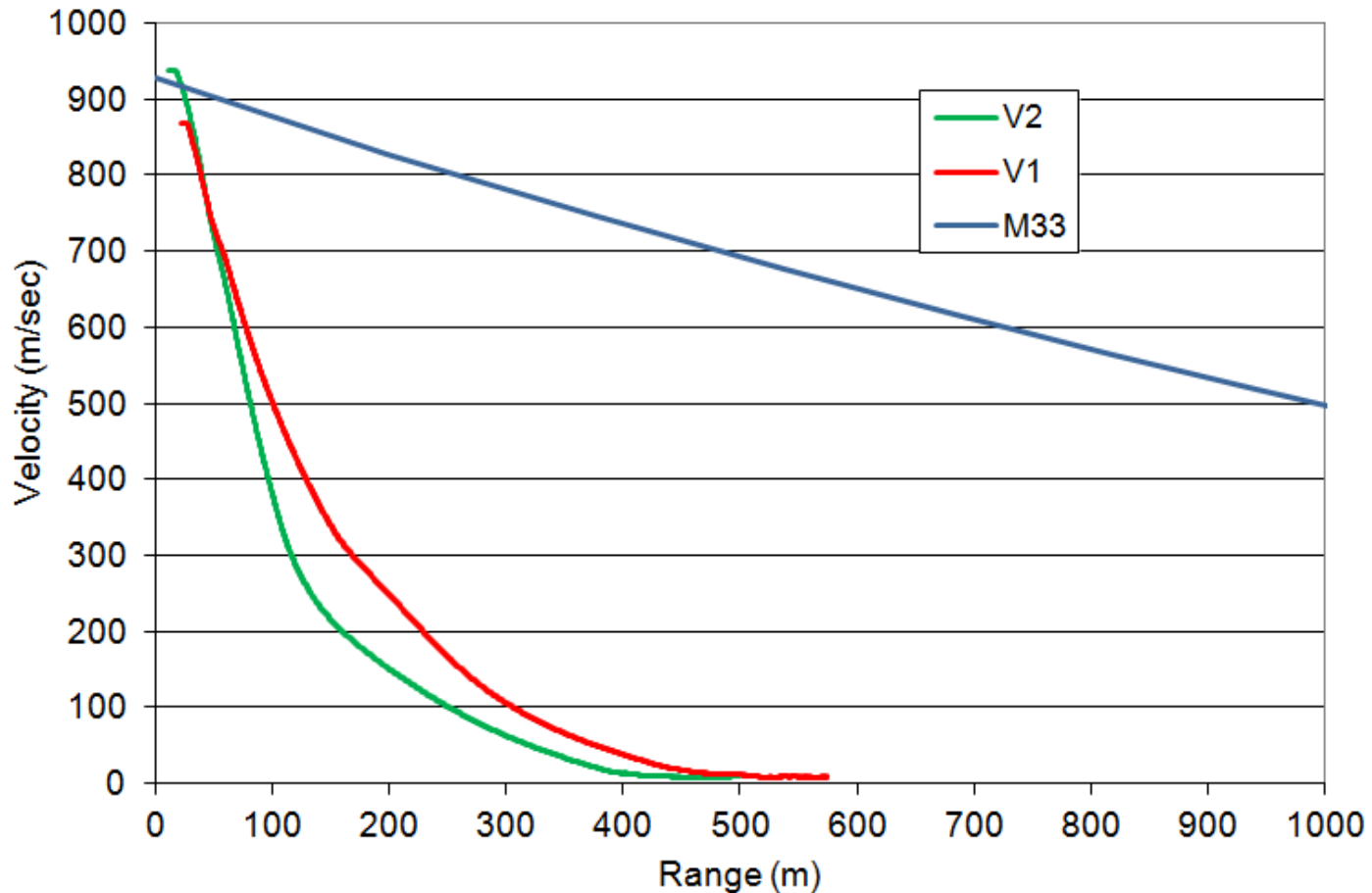
.50cal SRTA Development Update

- The .50cal SRTA Cartridge Design Changes :
 - Over 12 projectile concepts proposed and tested
 - The majority underwent functioning and maximum range tests
 - Using Design Of Experiment methods 1 concept was retained
 - Forward fins with controlled spin technology to limit range
 - Control surfaces introduce a "reverse" spin/opposing rotation, drag
 - Moulded frangible projectile
 - Projectile design and moulding parameters had to be selected and optimized for robustness
 - Dimensional tolerances
 - Compound optimization
 - Increased projectile integrity



.50 cal SRTA Ballistic Simulation

Velocity decay of .50cal SRTA (Radar) vs. M33 (Simulation)



V1

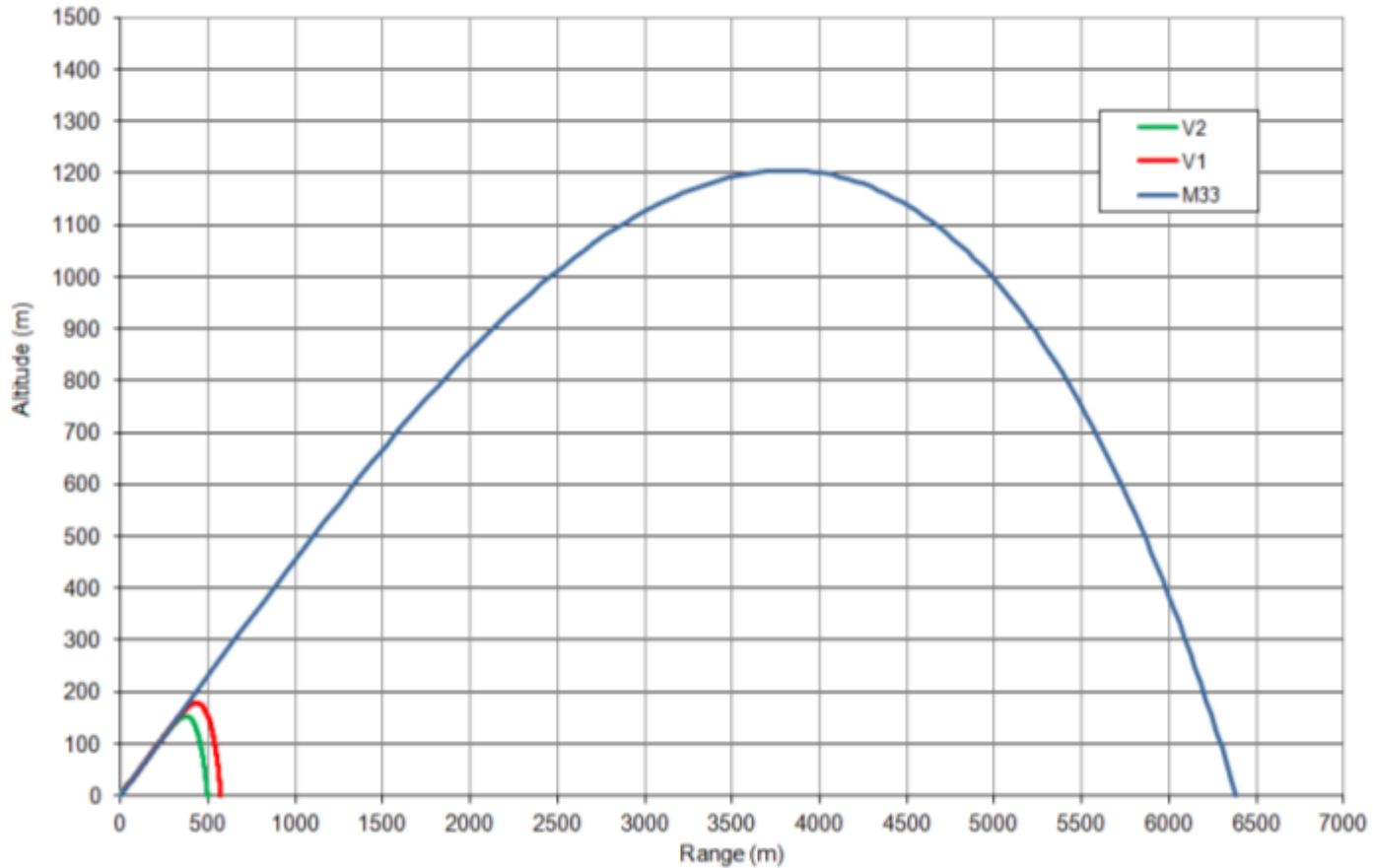


V2



.50cal SRTA Max Range

Comparison of max range (using radar)



V1



V2



.50cal SRTA Achieved Results

- ▶ The .50cal SRTA (Bull Nose – Final Version):
 - Increased projectile weight
 - Increased M2HB function reliability from -20 to +50°C
 - Assures M2HB function reliability on soft recoil mounts
 - Optimized rate of fire in M2HB (450-550 rpm)
 - Meets 700m maximum range with tail wind of 15km/hr
 - Reduced potential projectile breakup in hot barrels
 - No breakup in barrels heated to 600F
 - Increased robustness of projectile

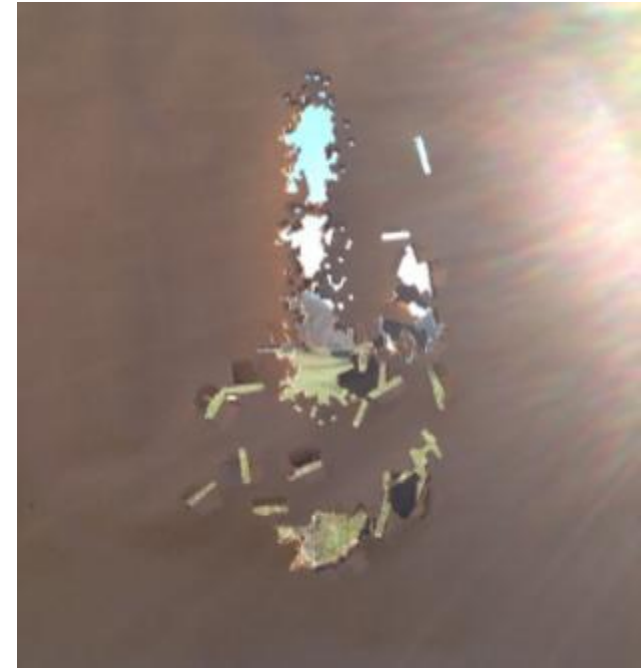


V2



.50 cal SRTA Barrel Heat Test

Projectile Integrity Test Nov 13



Target at 30 meters



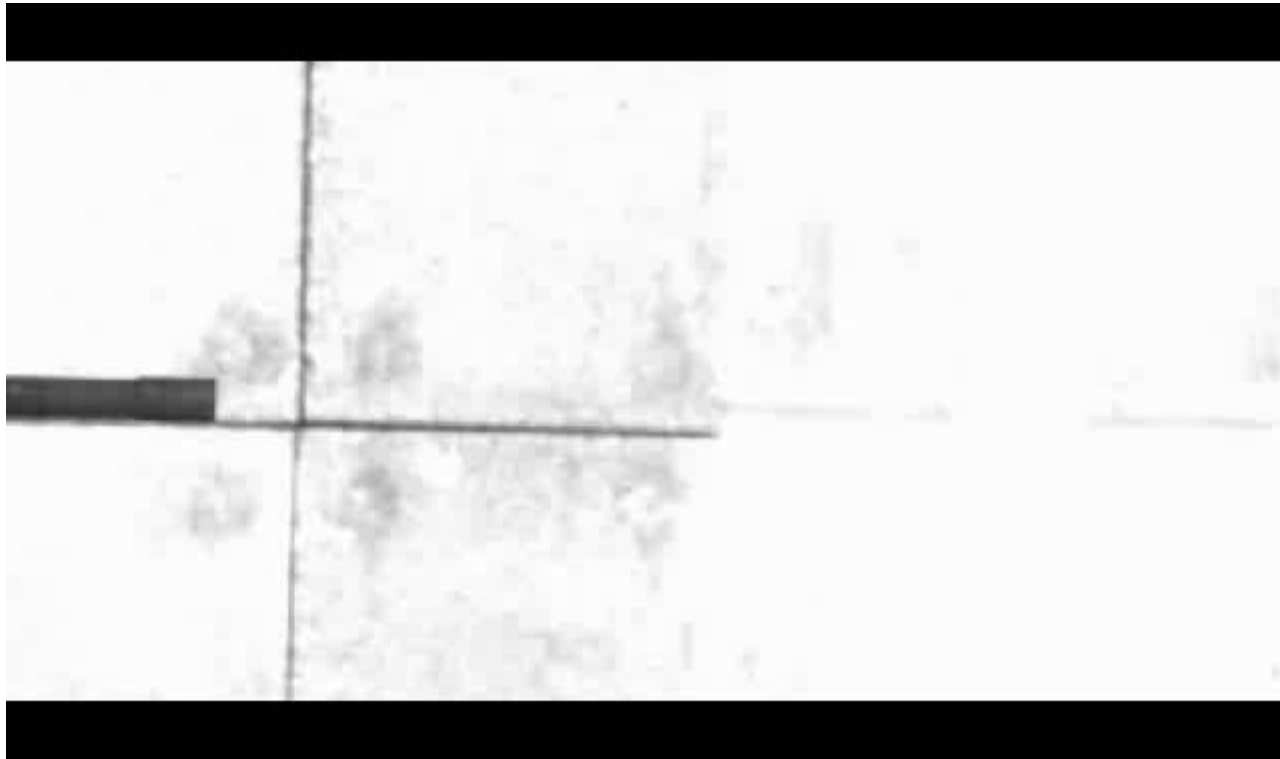
.50cal SRTA Achieved Results

- ▶ Projectile Integrity Tests



.50cal SRTA Achieved Results

- ▶ Projectile Integrity Tests



.50 cal SRTA Measured Performance

| Ammunition Type | Distance | 12,7mm Short Range | |
|---|----------|--------------------|------------------|
| | | GD SRTA (1) | M858 (2) |
| Dispersion mean radius in accuracy barrel | 150 m | 6.0 inch | Approx. 8.0 inch |
| Vertical match in accuracy barrel Vs M33 | 150 m | -12.0 inch | Not specified |
| Maximum effective training range | --- | 200 ± 50 m | 150 m |
| Maximum range | --- | 700 m | 700 m |

Note 1: New bull nose design as tested.

Note 2: Maximum value taken from MIL-C-70723 (AR).



.50cal SRTA – Tracer

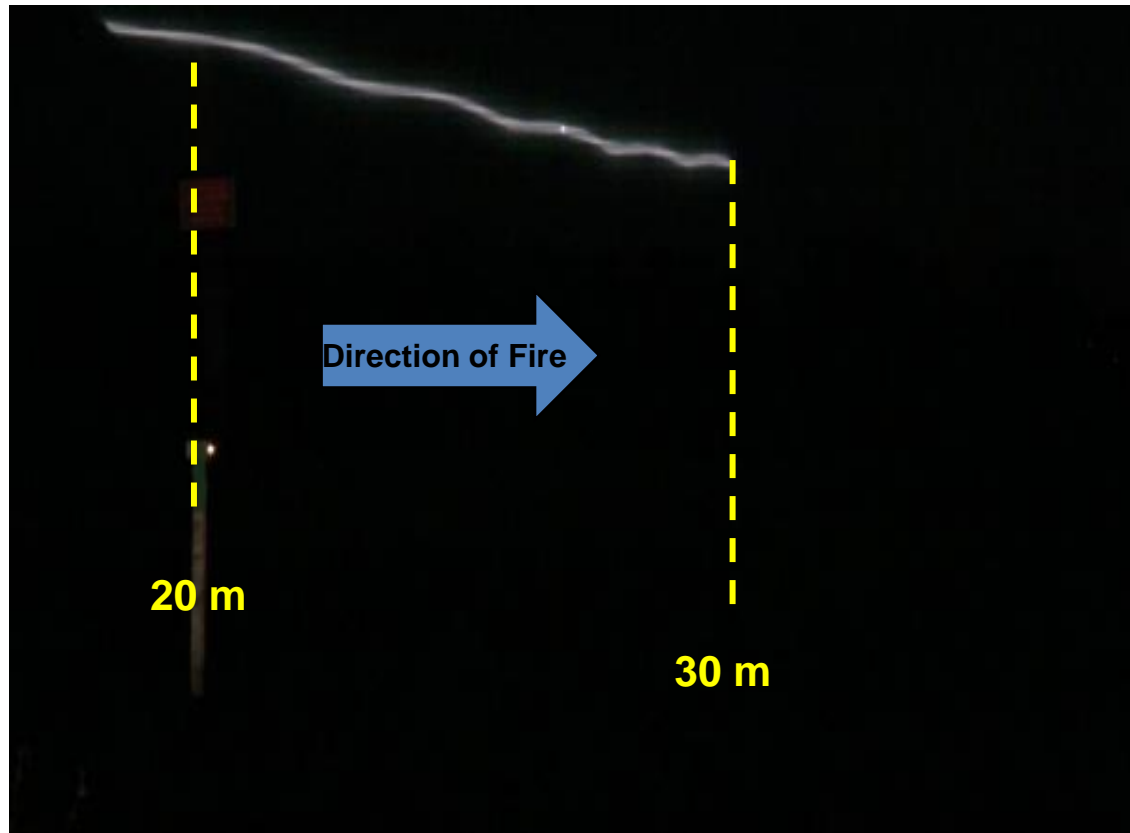
Preliminary Development Results

- ▶ .50cal SRTA – Tracer (Preliminary Development Phase)
 - Visible trace with naked eye from 20m to 150m (Mil-C-70723)
 - Min of 80% trace ignition and continuous trace
 - Same ballistic and functioning properties as ball version
 - Using Design Of Experiment methods considered several concepts (retained one)
 - Optimized compound and tracer hole parameters
 - Use of only igniter stage tracer; and
 - Optimizing molding parameters



.50cal SRTA - Tracer Achieved Results

Start of Trace 10m (Night Shoot)



1/30 s frame



.50cal SRTA - Tracer Achieved Results

Trace Distance (Night Shoot)



.50cal SRTA - Tracer Achieved Results

Trace Distance (Night Shoot)



150 m

180 m



.50cal SRTA - Tracer Achieved Results

Trace Visibility (Day Shoot)



.50cal SRTA - Tracer Achieved Results

Trace Visibility (Day Shoot)



.50cal SRTA - Tracer Achieved Results

Trace Visibility (Day Shoot)



.50cal SRTA Next Step

- Delivery of 3K rounds to US Govt to conduct Proof of Concept trials (to include tracer version also);
 - Majority of tests completed;
 - Environmental testing and analysis ongoing.
- GD OTS C has currently a low rate capability production (ball only)



SRTA Applications/Benefits

■ Training Applications/Benefits

- Significantly reduces training footprint and environmental impact
- Reduces friction created by units competing for range time
- Provides users with flexibility to train on home post on reduced safety template ranges
- Increased training throughput for individual or collective training
- Increases realism and training flexibility for mobile training scenarios due to added freedom of movement and wider arcs of fire
- Train with multiple calibers and weapons platforms on same collective training scenario.



.50cal SRТА Summary

■ SUMMARY

- .50 cal SRТА-Ball satisfactory meets the key customer requirements
- Addition of .50cal SRТА will optimize and complement individual and collective training event using multiple calibers (5.56mm, 7.62mm and .50cal).
- Will allow transparency of use for the user and maximize training, day or night.
- .50 cal SRТА-Ball currently in final qualification process with low rate production capability
- Samples available



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