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 ± 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
SHORT STOP® .50cal SRTA Development

.50 cal SRTA Main Design Drivers

- No modifications of M2 machinegun
- Reliable functioning from –20 to +50°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)
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)
Comparison of max range (using radar)
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
.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

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

**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)

Direction of Fire

20 m

30 m

1/30 s frame
.50cal SRTA - Tracer Achieved Results

Trace Distance (Night Shoot)

Direction of Fire

150 m
180 m
.50cal SRTA - Tracer Achieved Results

Trace Distance (Night Shoot)

150 m

180 m
Trace Visibility (Day Shoot)
.50cal SRTA - Tracer Achieved Results

Trace Visibility (Day Shoot)
.50cal SRTA - Tracer Achieved Results

Trace Visibility (Day Shoot)
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)
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 SRTA Summary

SUMMARY

- .50 cal SRTA-Ball satisfactory meets the key customer requirements
- Addition of .50cal SRTA 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 SRTA-Ball currently in final qualification process with low rate production capability
- Samples available
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