Developments in Short Range Training Ammunition

ALWAYS ON target

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GENERAL DYNAMICS
Ordnance and Tactical Systems–Canada

GD-OTS Canada SRTA Developments

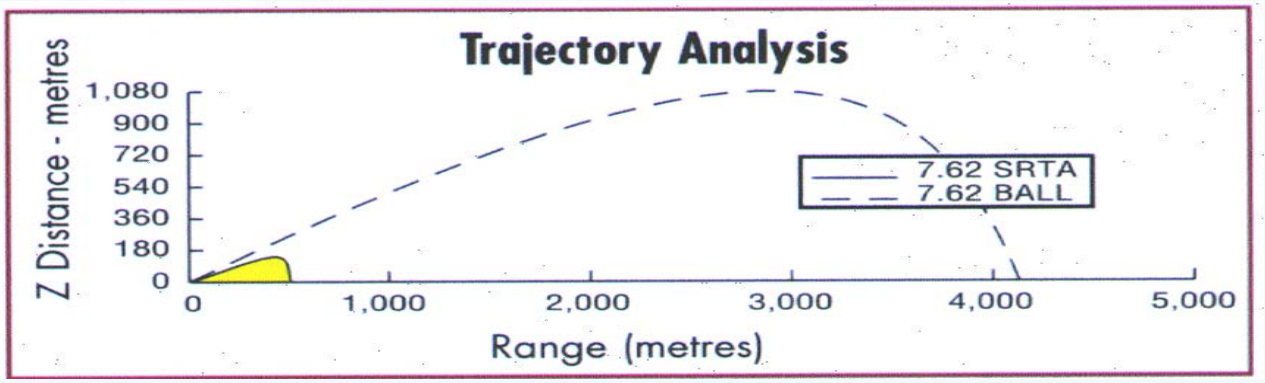
- Project Objectives for 5.56mm and .50cal SRTA
- Current 7.62mm SRTA
- Concept for 5.56mm and .50cal SRTA
- Performance
  - Simulations
  - Test Data
- Applications/Benefits
- Summary

Short Range Training Ammunition (SRTA) Project Objectives

- **To develop a 5.56mm and .50 cal SRTA**
  - Eliminate need for weapon adaptors/ancillary equipment
  - Increase effective ballistic match and training range of current SRTA
  - Maximum range limited to approx 10% to 20% of ball
  - Increase functioning reliability on respective weapon systems
  - Increase performance with respect to current SRTA:
    - **M862 (5.56mm SRTA)**
    - **M858 Ball and Tracer M860 (.50 cal SRTA)**

Current Product
SHORT STOP® 7.62 mm SRTA

- 7.62 mm SHORT STOP® training round
- Available in 4B/1T configuration
- Now in Production for DoD as M973 & M974



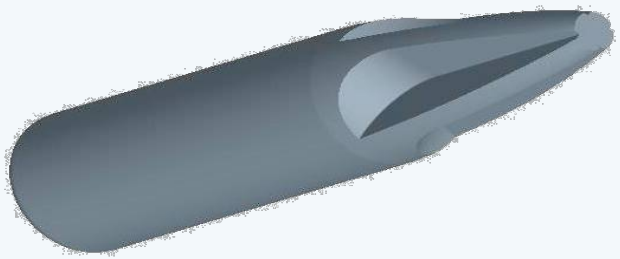
SHORT STOP® 5.56 mm SRTA Development

- **5.56mm SRTA Requirements:**
  - No weapon modification (conversion bolt)
  - Max range of 600 m (at any elevation)
  - Trajectory match up to 100m within ±2mils (threshold)
  - 10 rds dispersion@100m ≤7.0cm (average mean radius)
  - Full functional capability in M4/M16/M249

    from -4°F to 104°F

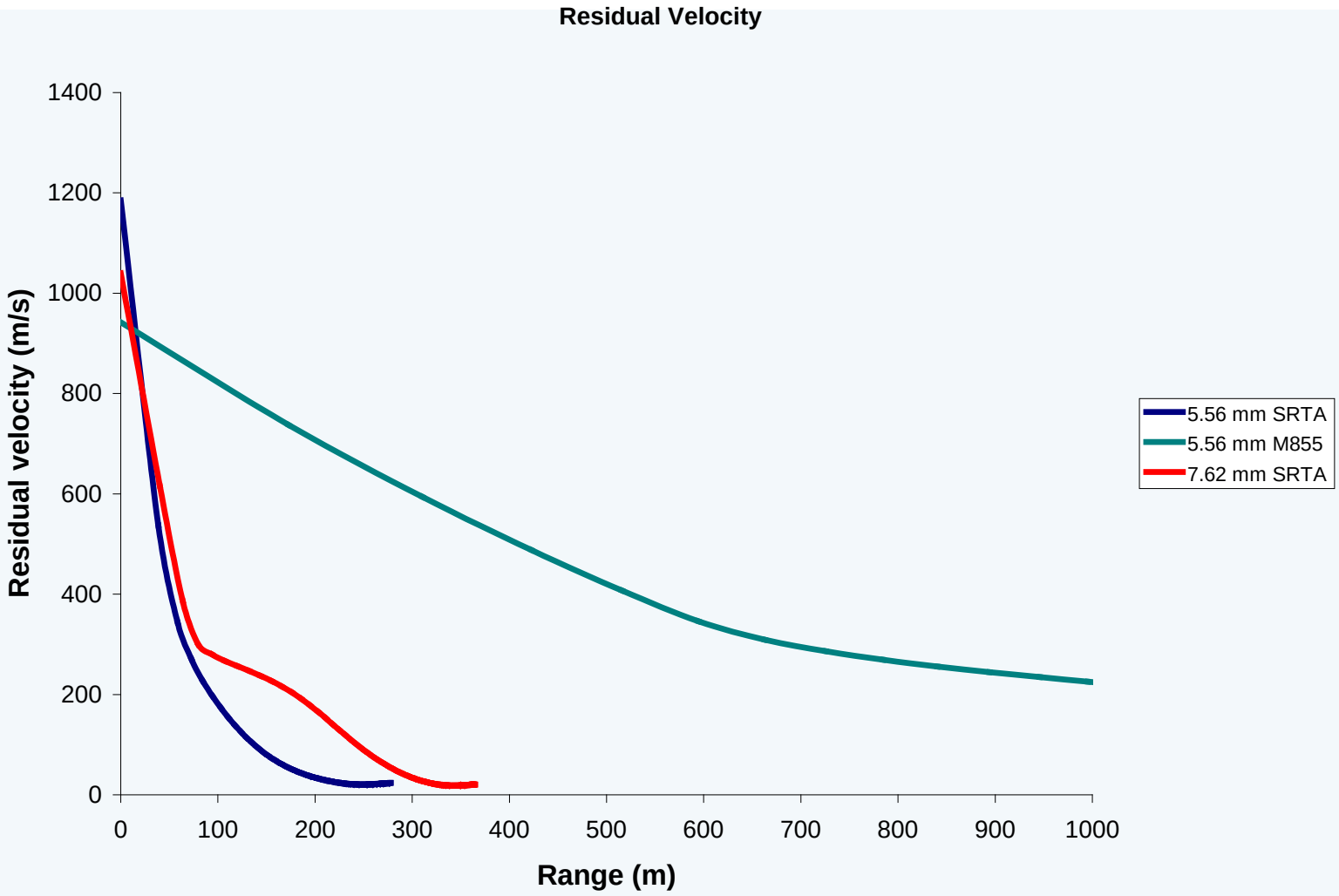
5.56mm SRTA Concept

- **The 5.56mm SRTA Cartridge:**
  - Lightweight molded compound projectiles (approx 2.25gr);
  - Frangible lead free projectile;
  - Forward fins design;
  - Low environmental impact
    - Material: No toxic/heavy metals;
    - Reduced terminal effects;
    - Reduced max range;



SRTA Ballistic Simulation

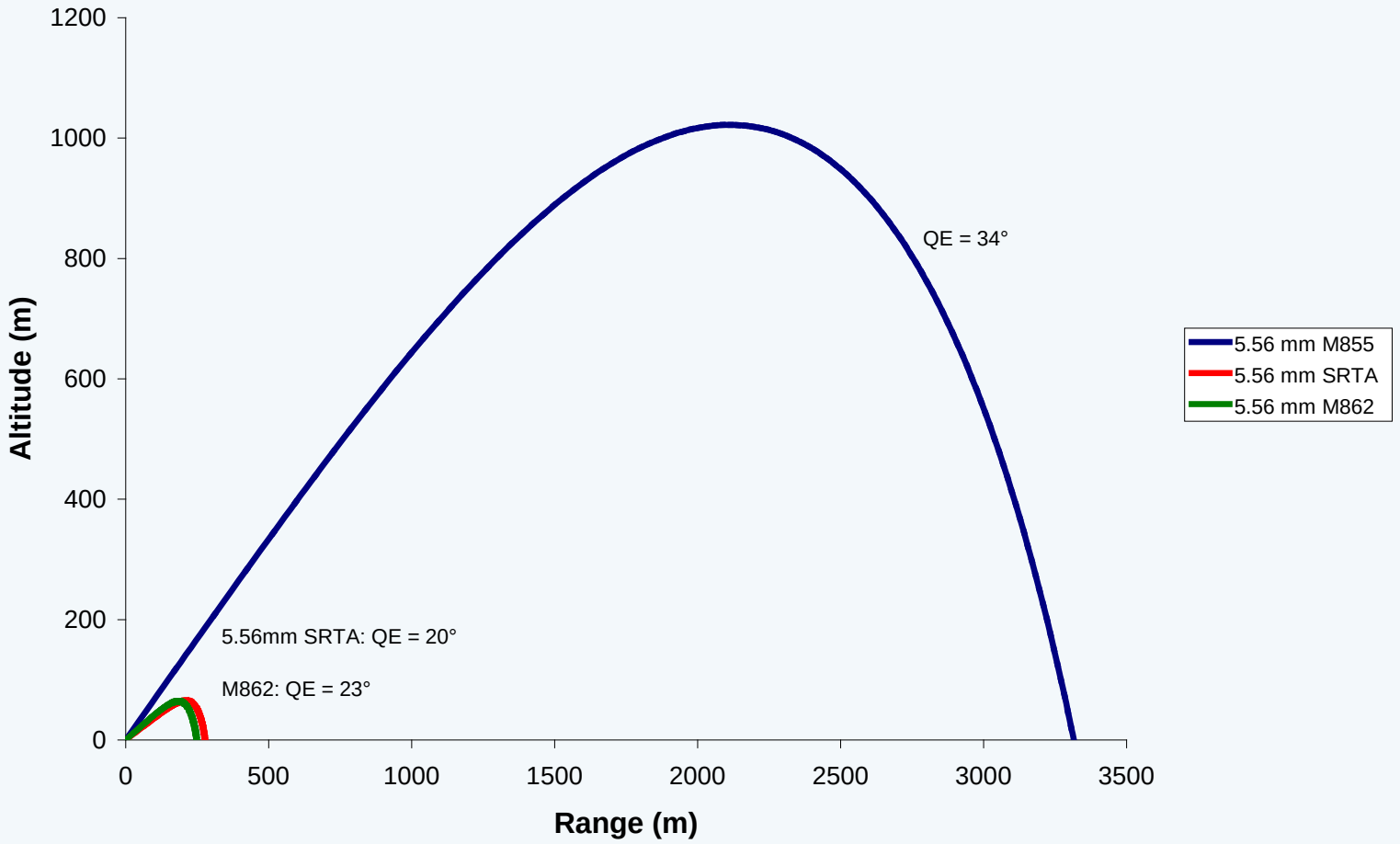
Comparison of velocity decay (PRODAS)



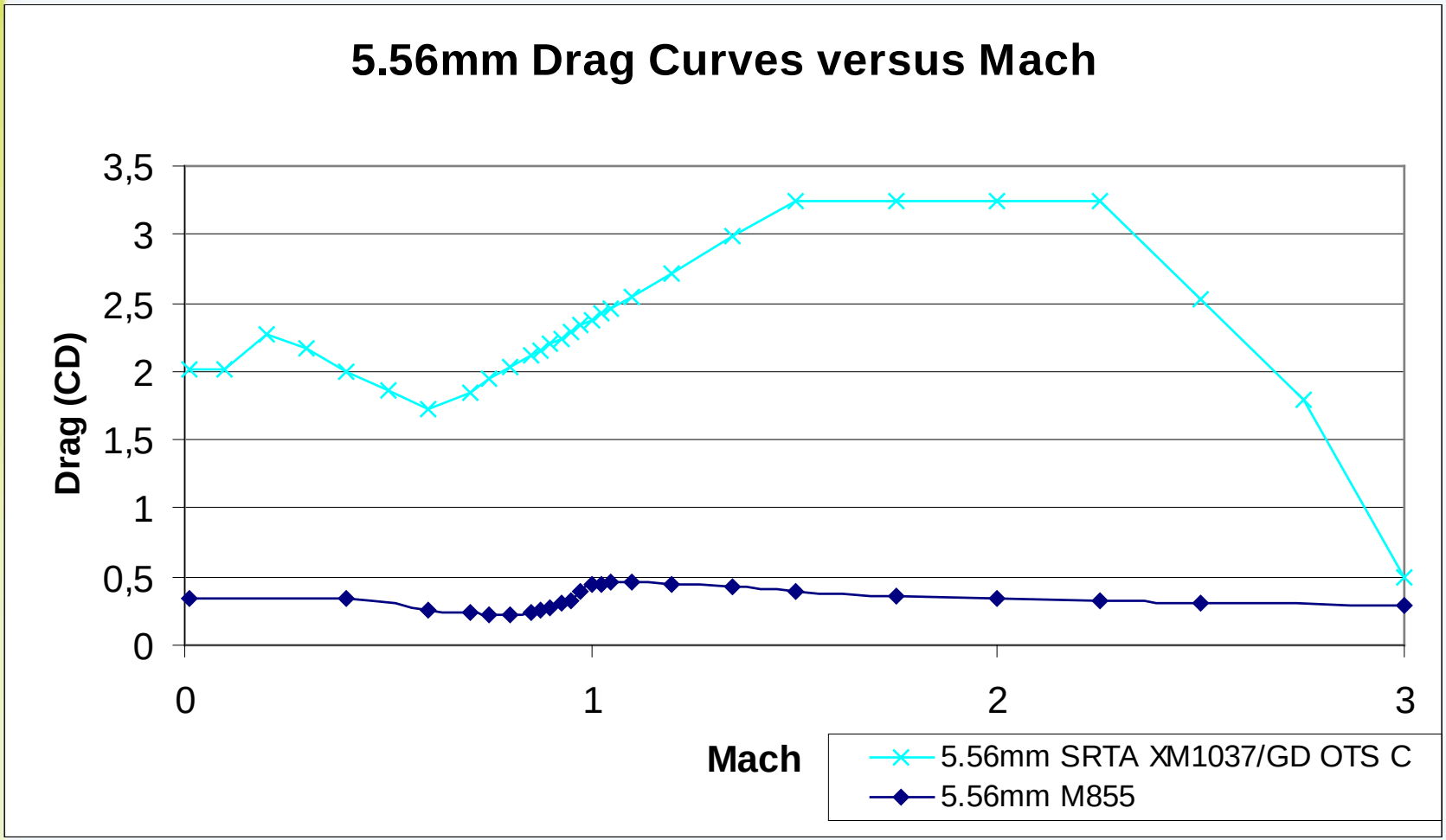
SRTA Ballistic Simulation

Comparison of max range (PRODAS)

Trajectory with 5.56 mm caliber



SRTA Ballistic Simulation



SRTA Ballistic Live Fire Results

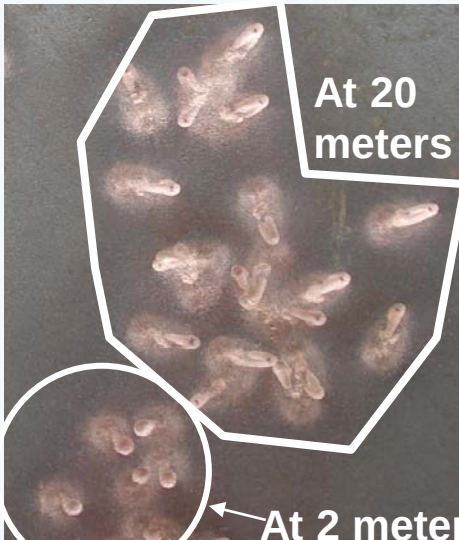
Performance Summary

Ammunition	Distance (m)	5.56mm SRTA	
		GD XM1037	M862[1]
			
Dispersion Mean radius in accuracy barrel	25	.29 in	.30 in
	100	2.64 in	NA
Vertical Match at target located X meters from the weapon vs operational ammunition- accuracy barrel	25	.16 in	.79 in
	100	5.12 in	NA
Maximum training range	approx	100 m	25 m
Functioning in M4		YES	NA
Functioning in M16		YES	As per spec
Functioning in M249		YES	NA
Maximum range		600 m[2]	250 m

Note 1: Maximum value taken from MIL-C-70725A (AR)
Note 2: Maximum range measured was **434m**

5.56mm SRTA Next Step

- **Delivery of 160K rounds to US Govt to conduct Design Verification Testing at APG (Phase III contract delivered June 2009);**
  - Majority of tests completed;
  - Environmental testing and analysis ongoing
- **Limited production by GD OTS C fall 2010**



SHORT STOP® .50cal SRTA Development

- **.50cal SRTA Original Requirements:**
  - No modifications of M2 machinegun
  - Improved ballistic match with M858 & M860 (T)
  - Reliable functioning from –20 to +50ºC
  - Lead free projectile
  - Max range of 700 m (objective), 1000m (threshold)
  - No splashback beyond 25 m (Target at 50m)
  - Improved performance vs. M858

GD OTS C .50cal SRTA

M858

.50 Cal SRTA Voice of Customer

Conclusions

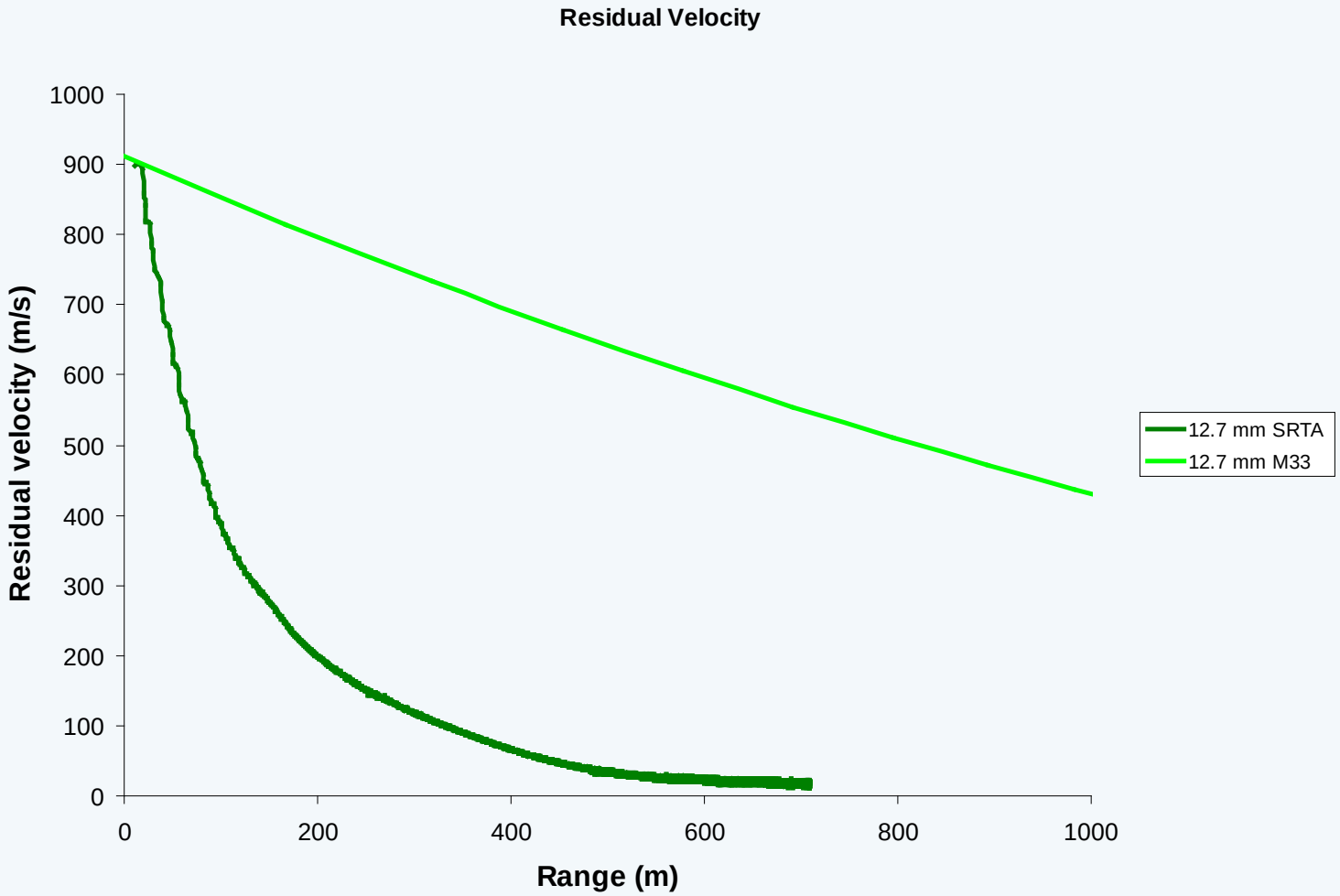
- Key Customer Requirements
  - Projectile Must not make use of any recoil amplifiers and/or buffer devices
  - Surface Danger Zone (SDZ) requirements have precedence over ballistic match
  - Projectile should not exceed 700m (Objective) and 1000m (Threshold). Revised threshold max range 700m.
  - Projectile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

.50 cal SRTA Concept

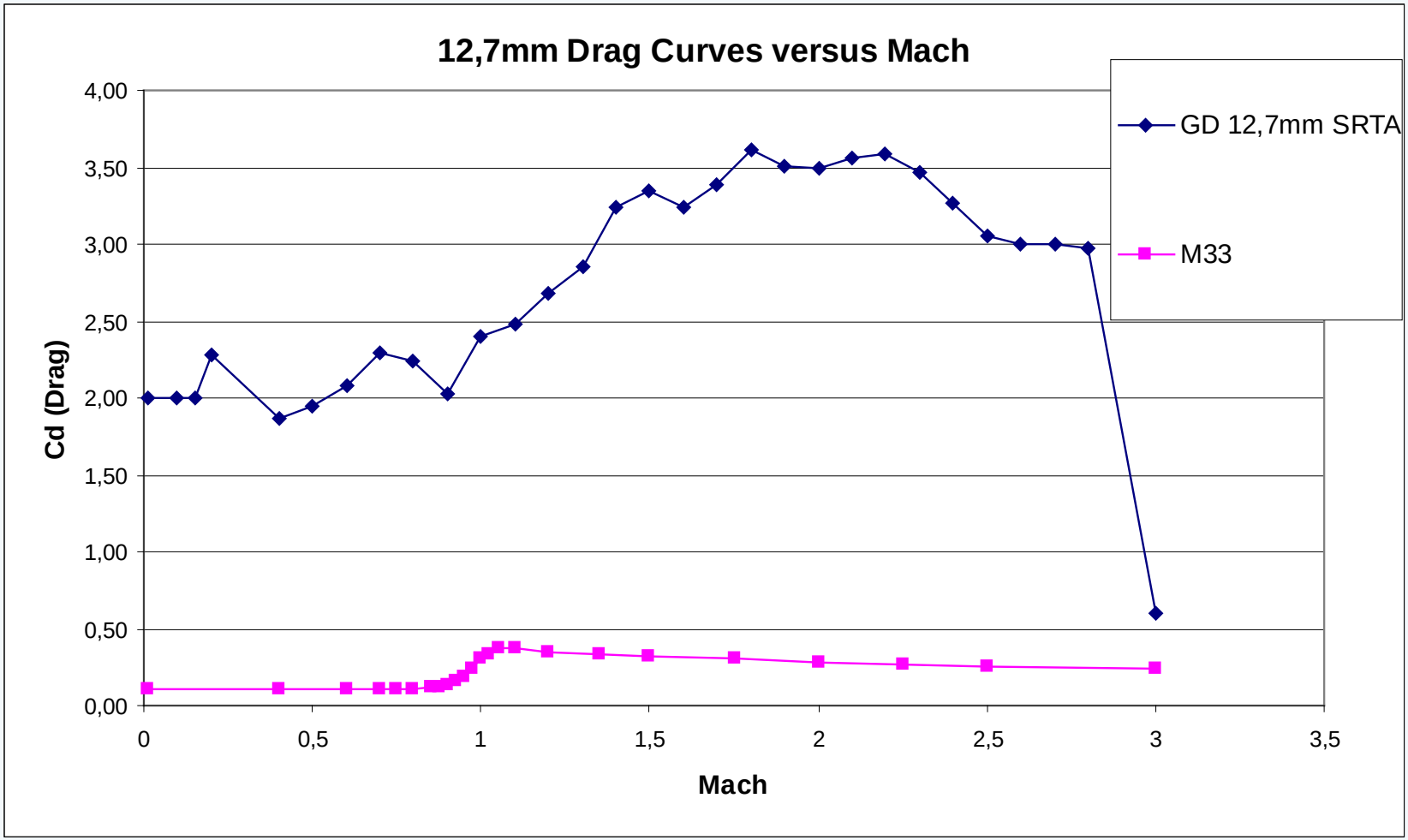
- **The .50 cal SRTA has:**
  - Several projectile concepts under study
  - Forward fins with controlled spin technology to limit range
    - Fins introduce a "reverse" spin/drag, opposing rotation
    - The projectile quickly becomes dynamically unstable
  - Very good accuracy due to consistent ballistic performance
  - Frangible lead free projectile seems to be most promising concept at this time

.50 cal SRTA Ballistic Simulation

- Velocity decay vs. M33 simulation with PRODAS

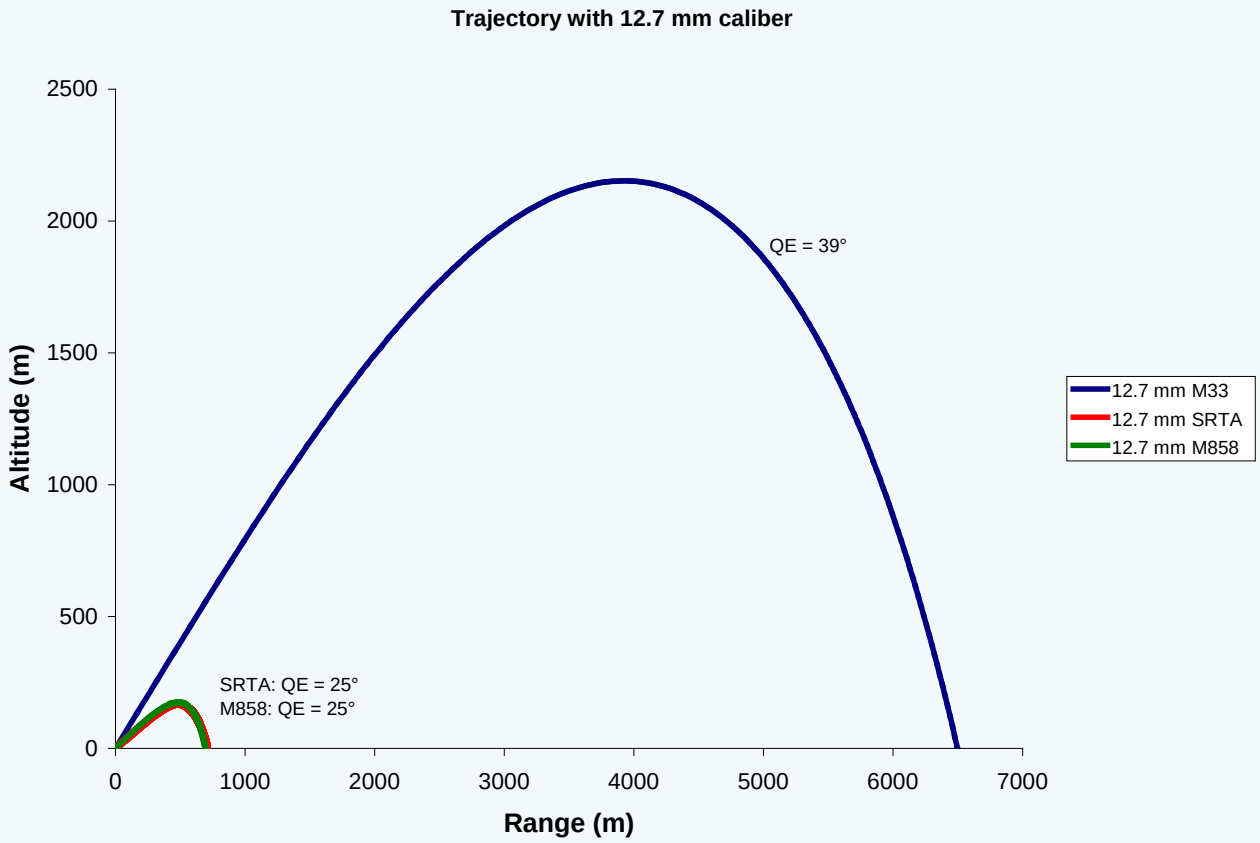


.50 cal SRTA Ballistic Testing



.50 cal SRTA Ballistic Simulation

- **Maximum range simulation with PRODAS**
  - Upcoming concept: less than 700 meters



.50 cal SRTA Measured Performance

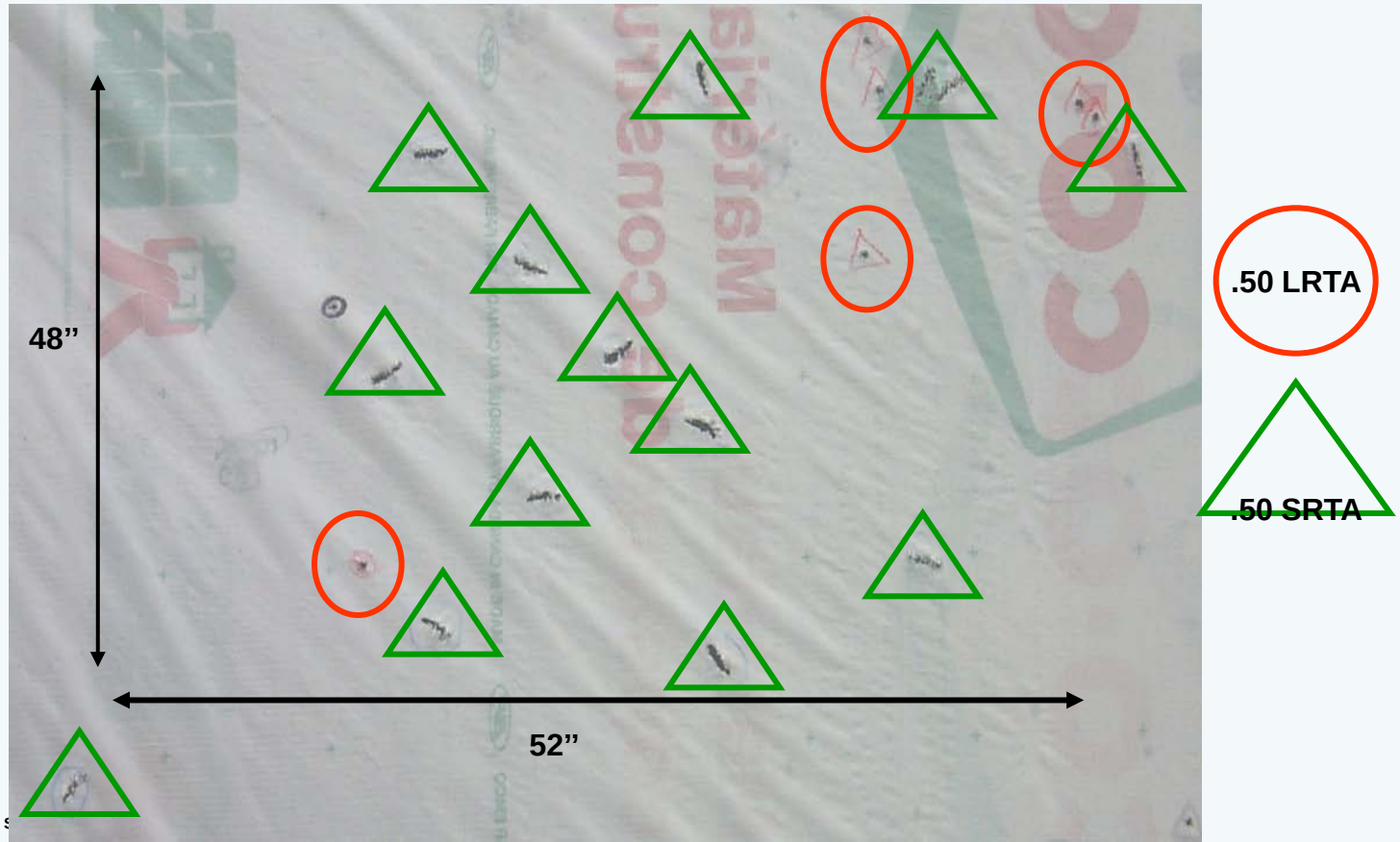
		12,7mm SRTA	
Ammunition	Distance (m)	GD SRTA	M858[1]
Dispersion Mean radius in accuracy barrel	100	1.6 in	approx. 8 in
	300	5.8 in	
Vertical Match at target located X meters from the weapon verses operational ammunition- accuracy barrel	100	.9 in	-
	150	4.7 in	no specified match
Maximum training range		300 m[2]	150 m
Maximum range		720 m[2]	700 m

note 1: Maximum value taken from MIL-C-70723 (AR)

note 2: As tested

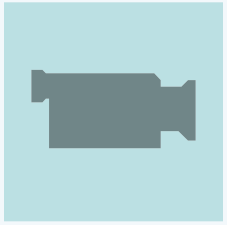
.50 cal SRTA Ballistic Testing

- **300 Meter Ballistic Match and Accuracy Testing Oct 09**
  - Tripod mounted machine gun (not an accuracy barrel)
  - Dispersion grouping of 52x48 inches (M2 HB MG – tripod)

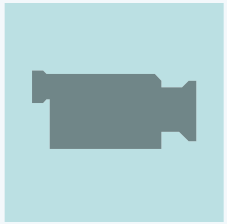


SRTA Ballistic Testing

- Weapon cycling video



5.56mm SRTA



.50cal SRTA

5.56mm and .50cal SRTA Summary

SUMMARY

- The new family of small calibre SRTA lead free, frangible concept represents an advance in SHORT RANGE small arms training technology
- The 5.56mm and .50 cal SRTA is currently an in-house R&D project
- The new family of small calibre SRTA will optimize the use of range training resources due to its significantly reduced danger-template

Developments in Short Range Training Ammunition

Questions?