RDECOM

Malcolm Baldrige National Quality Award 2007 Award Recipient

ARMAMENT RESEARCH, DEVELOPMENT AND ENGINEERING CENTER
PICATINNY ARSENAL, NJ

TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

7.62mm, Lethal Limited Range Round For USCG

Informational Brief for **NDIA 2010**

19 May 2010

Project Overview & Objectives

Overview

- JSSAP funded effort for USCG
- 7.62mm Lethal Limited Range Round
- For use in harbor security applications.

Objectives

- Reduced maximum range
- Engage and defeat

Customer Requirements

- Defeat 1/4 inch of mild steel at 200 meters, at a 45-degree angle
- Match trajectory of M80 out to at least 400 meters.
- Capable of defeating soft target out to at least 400 meters.
- Maximum range of 2000 Meters (1500 Meters desirable)
- Capable of being fired from an M14 rifle and M240 Machine Gun

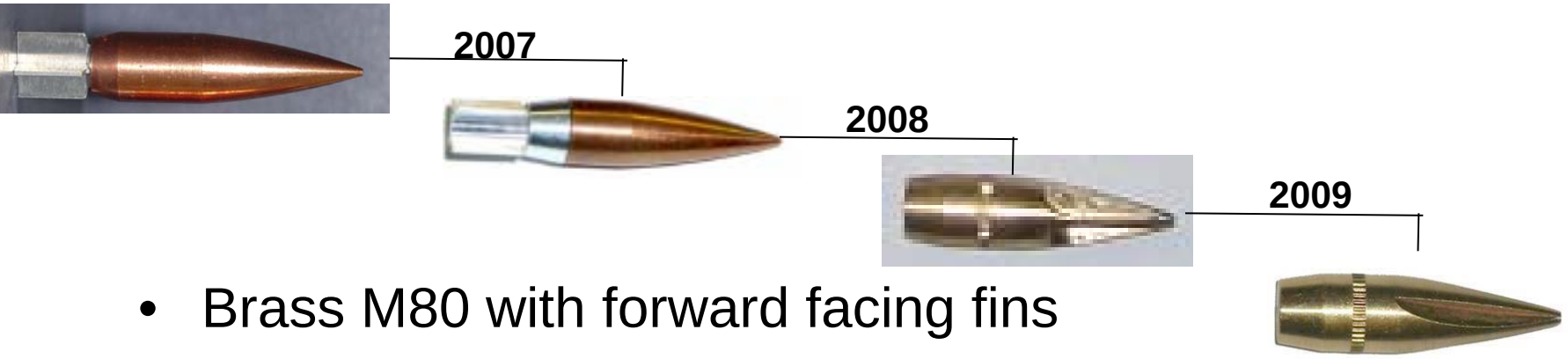
M80

L2R2

Value to Warfighter

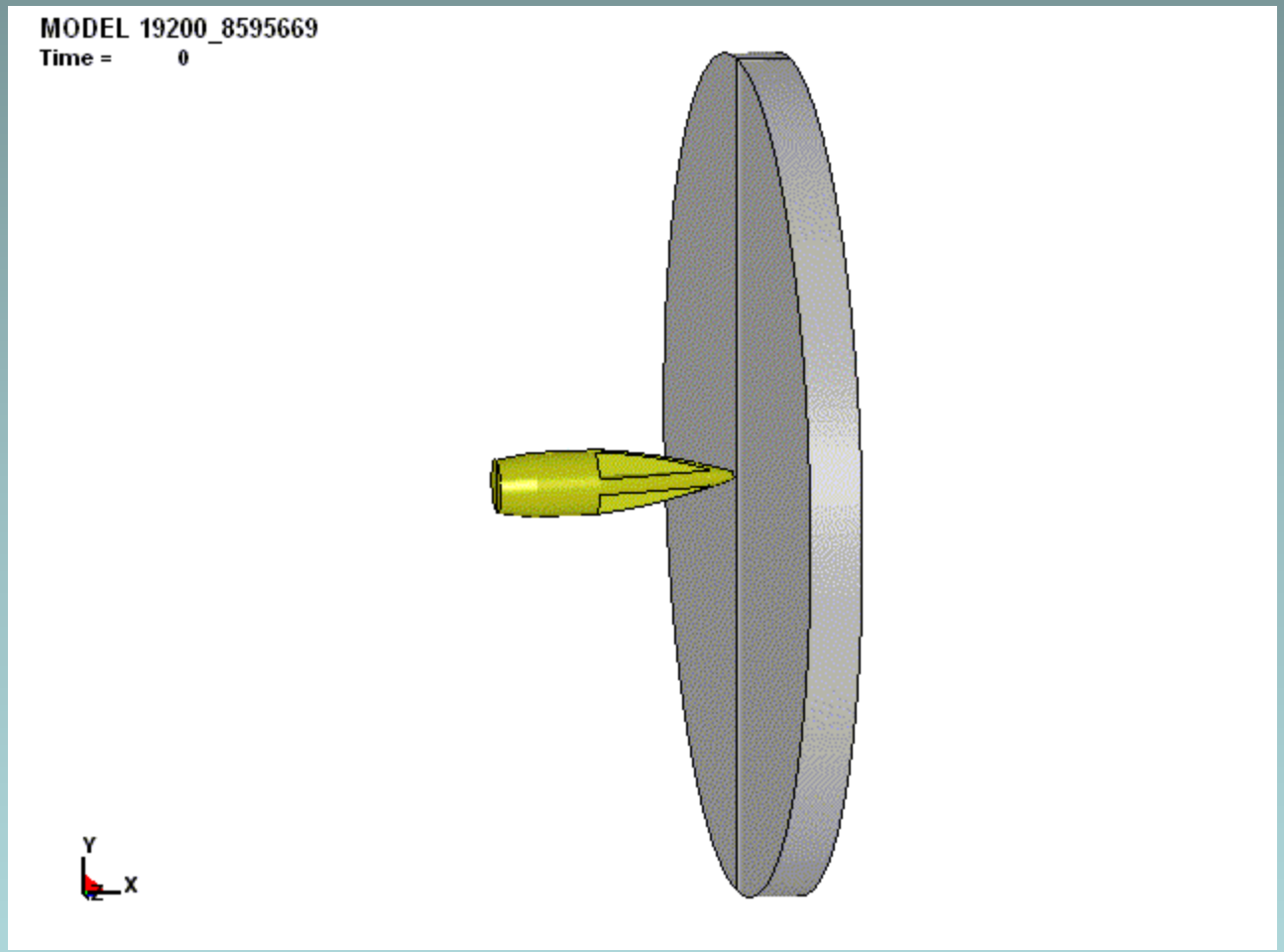
- Operational environment close to civilian populace
- Lethal force often necessary to accomplish missions
- Use of Small Arms at times is restricted due to potential risk to civilians
- Reduced range ammunition will enable USCG to engage targets

Summary From 2008

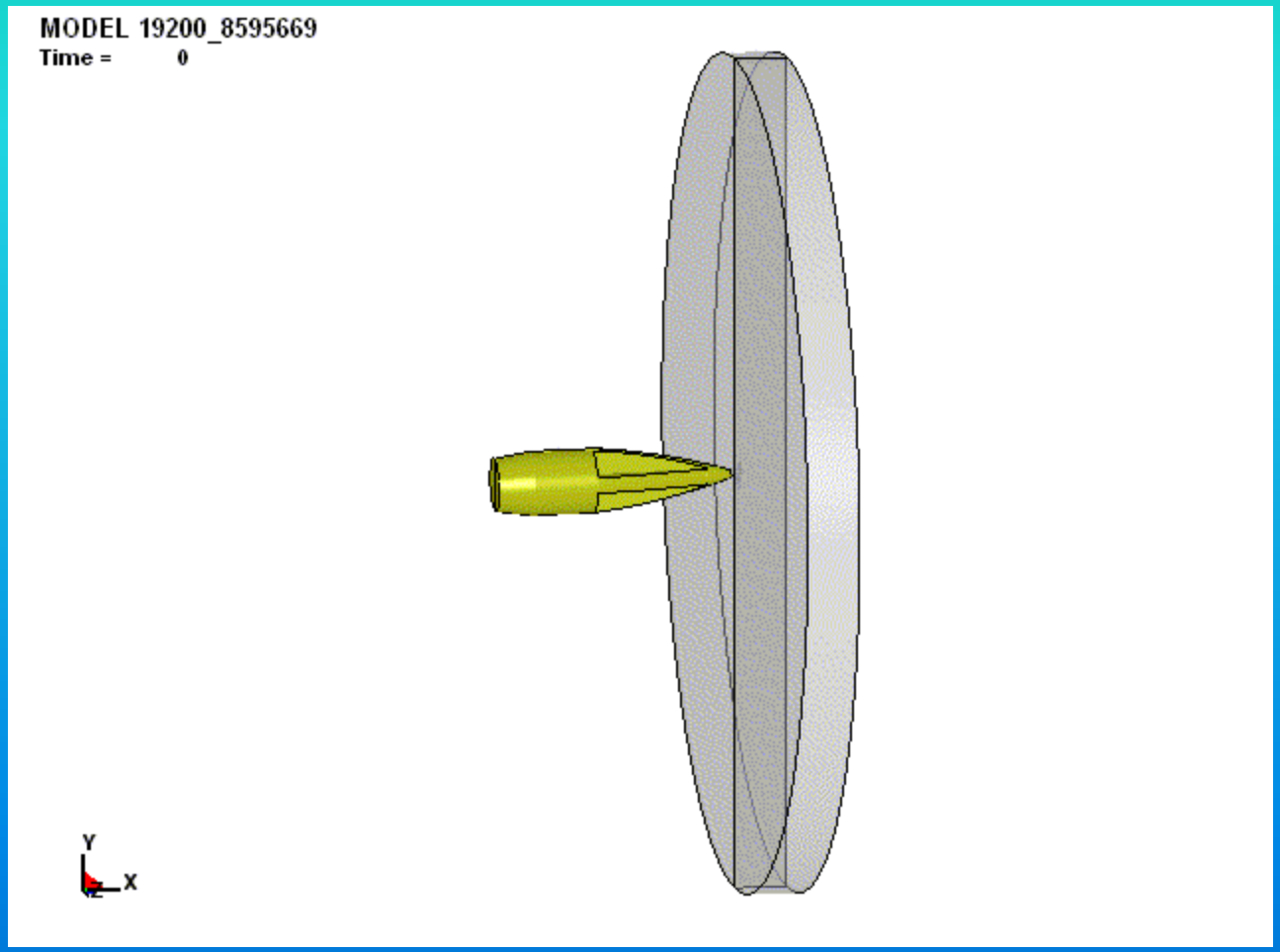


- Brass M80 with forward facing fins
  - Pro
    - Low dispersion
  - Con
    - Poor target penetration
- Future Tasks
  - Model and Simulate projectile target penetration
  - Redesign for penetration and improved dispersion
  - Dispersion test at 400m
  - Radar test for max range

Penetration Simulation
1820 ft/s



Penetration Simulation
2230 ft/s



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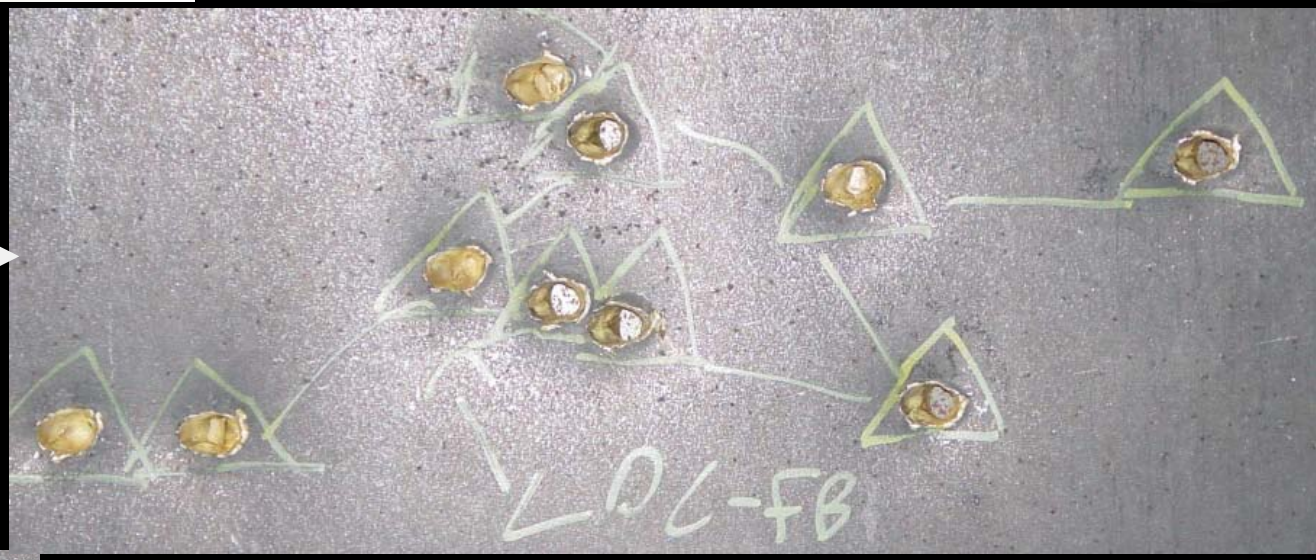
Target Penetration 45 Deg Obliquity

Design LDC-FB
50% Perforation



Design LC-FB
100% Perforation

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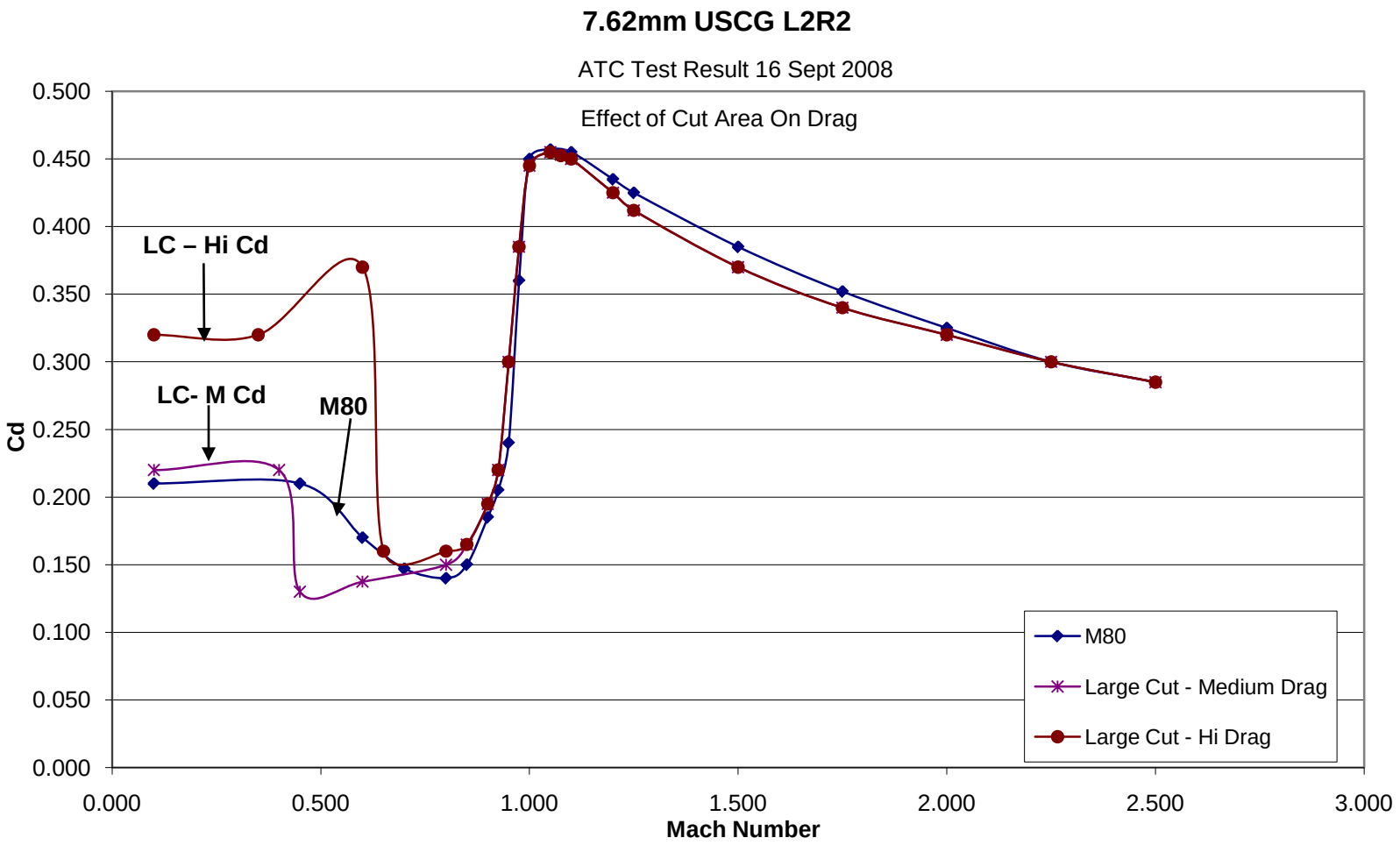
Target Penetration 45 Deg Obliquity

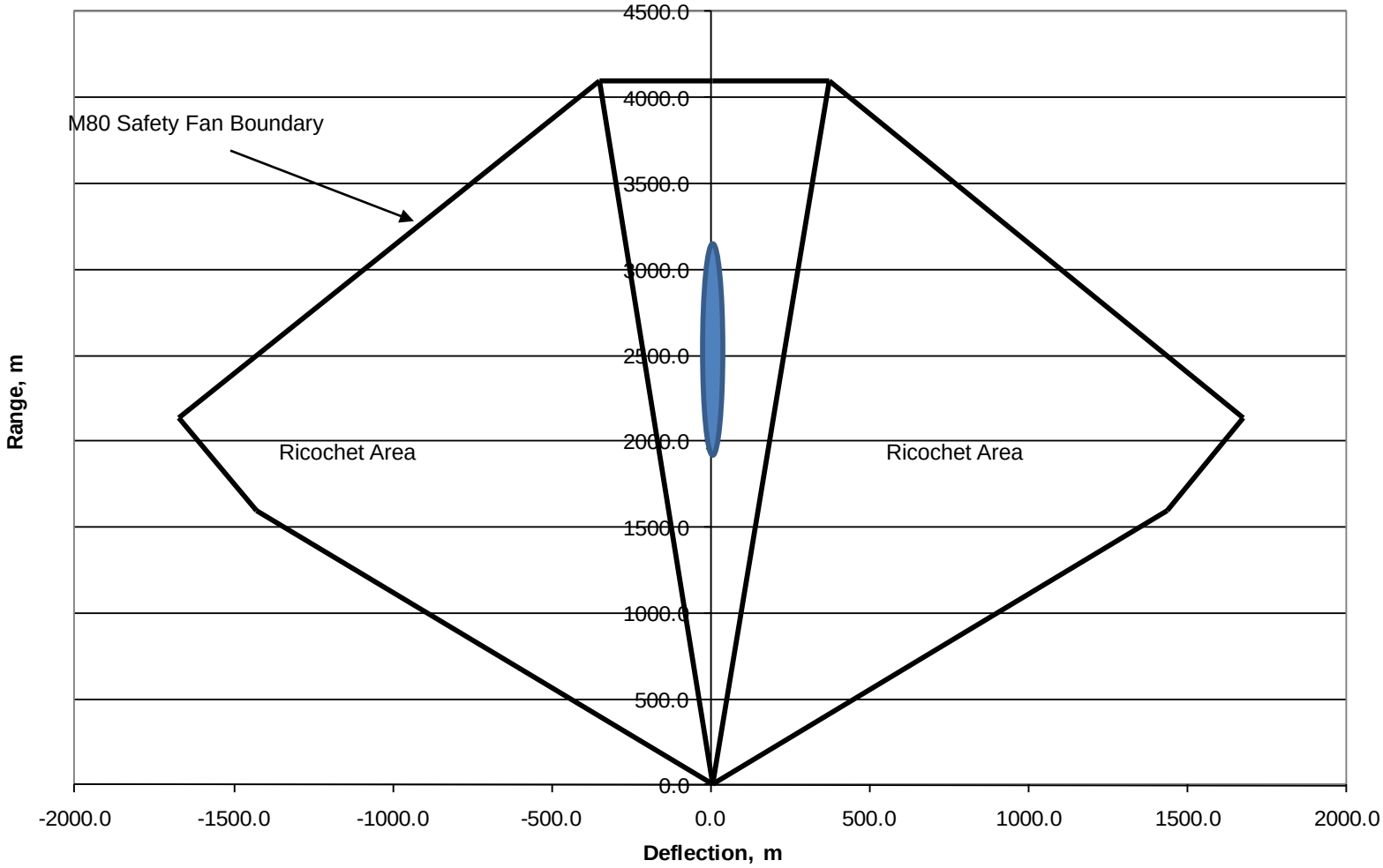
M80 Ball
80% Perforation

Mach vs. Drag LC-FB



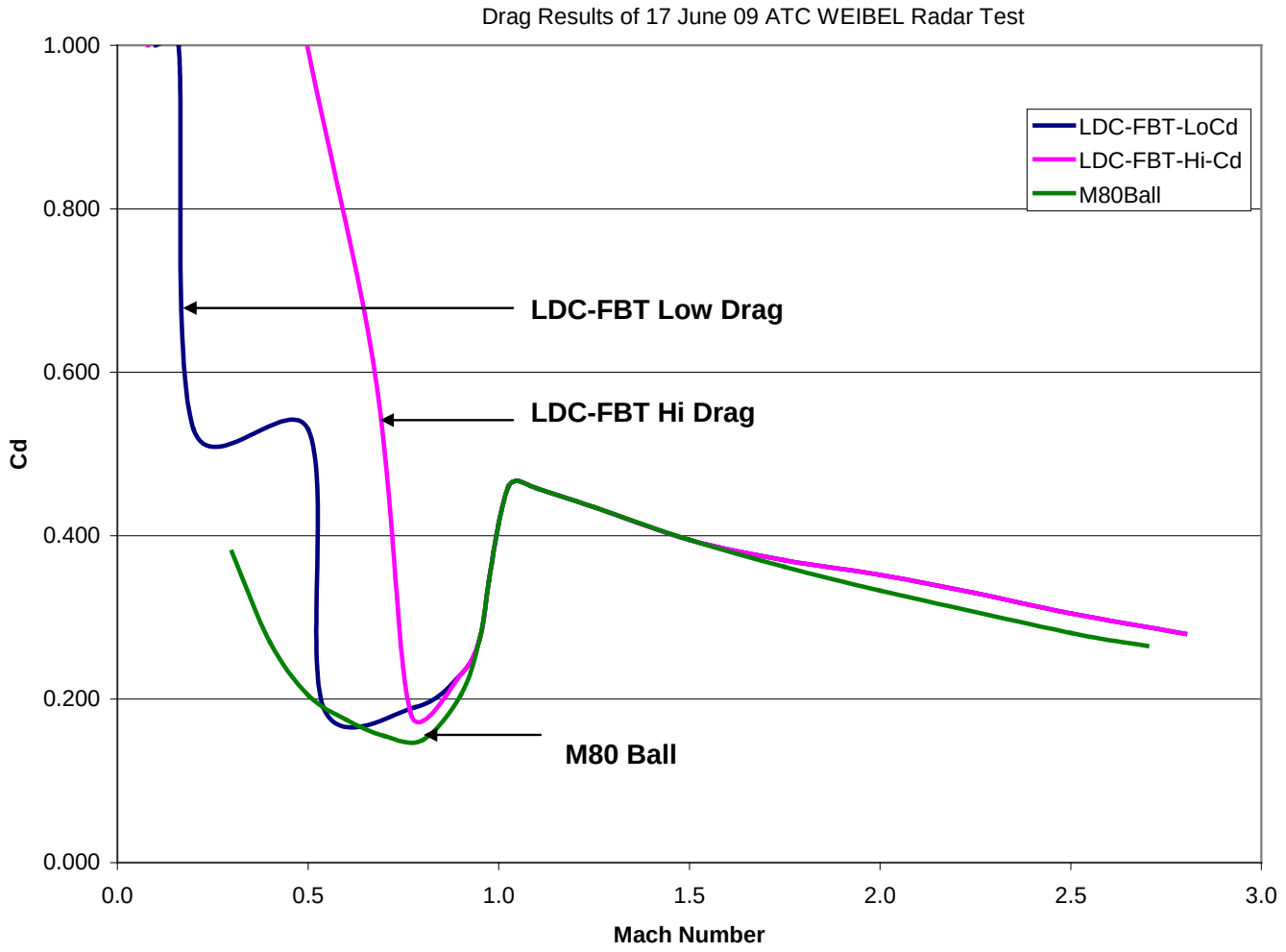
LC-FB Impact Locations on M80 Safety Fan

LC-FB fired from M240B at 10° & 30° QE

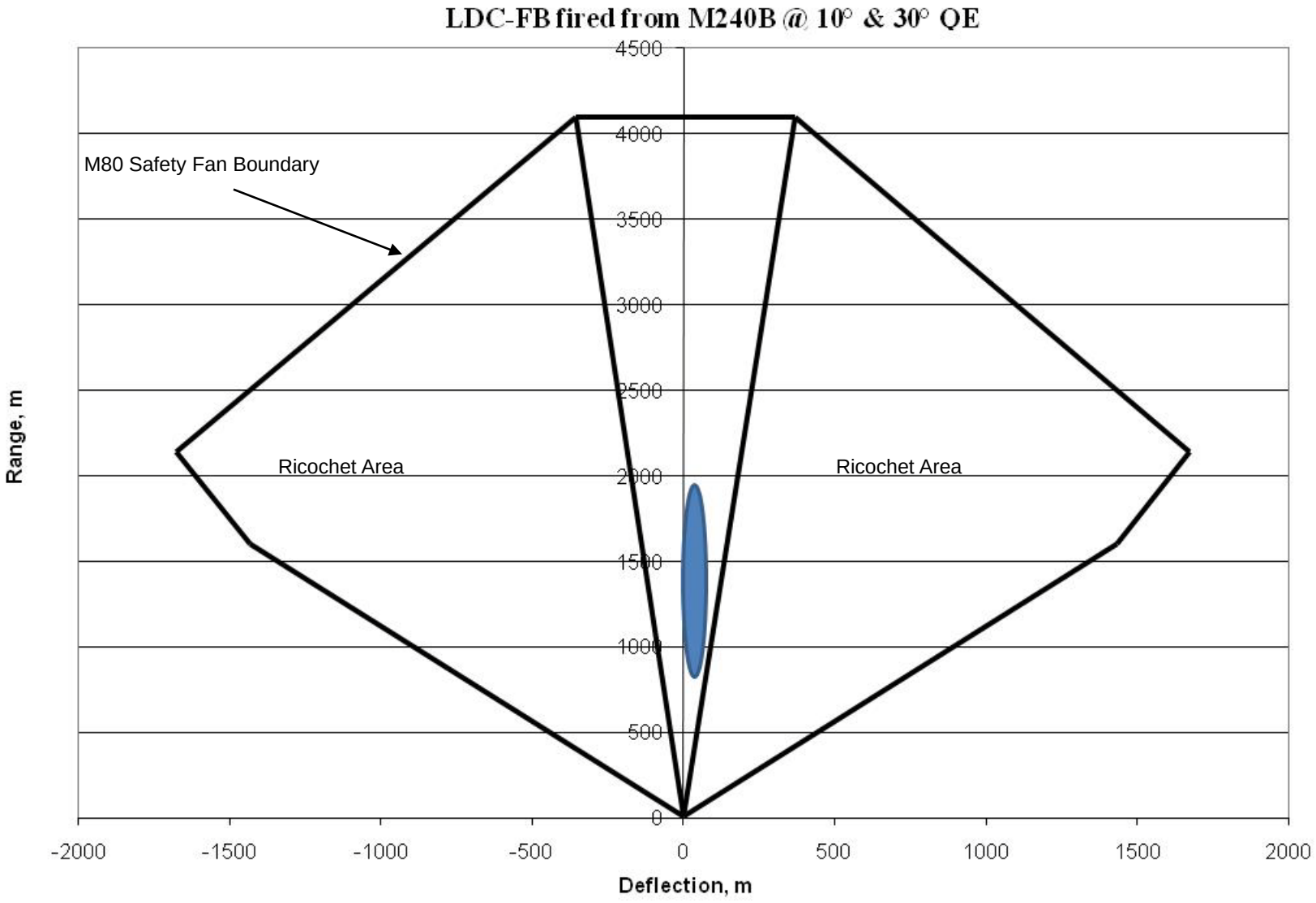


Mach vs. Drag LDC-FB

7.62 mm USCG L^2R^2



LDC-FB Impact Locations on M80 Safety Fan



M80 Ball vs. LC-FB vs. LDC-FB

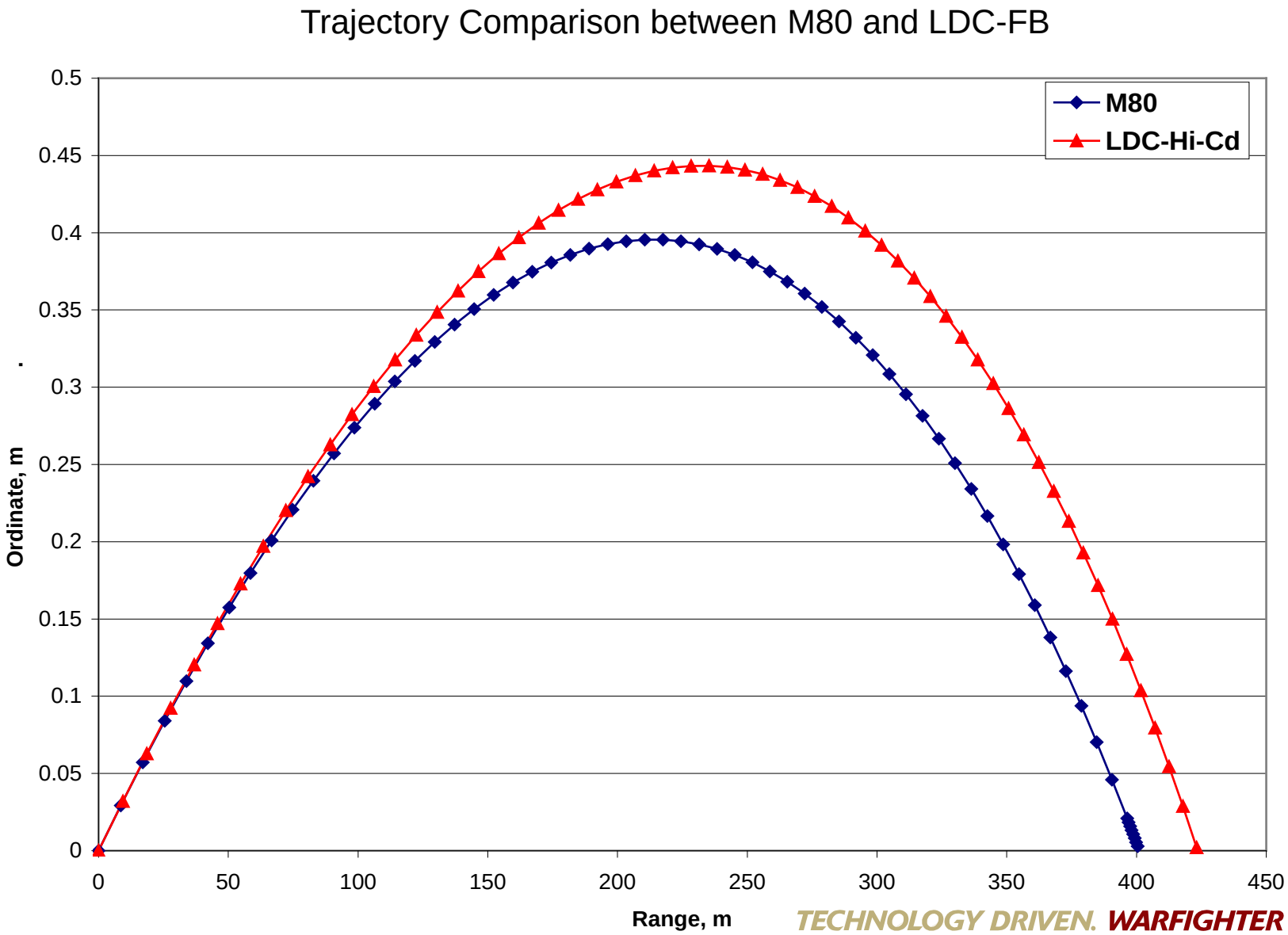
KPPs	M80 Ball	LC-FB	LDC-FB
≈ Max Range, 10° QE (m)	2765	2390	1865
≈ Max Range, 30° QE (m)	3715	3283	1967
Function M240B	Y	Y	Y
Perforate Steel Target @ 200m at 45° angle	Y	100%	50%
Defeat Soft Target @ 400m	Y	Y	Y
Match Trajectory of M80 @ 400M	—	N	N

M80

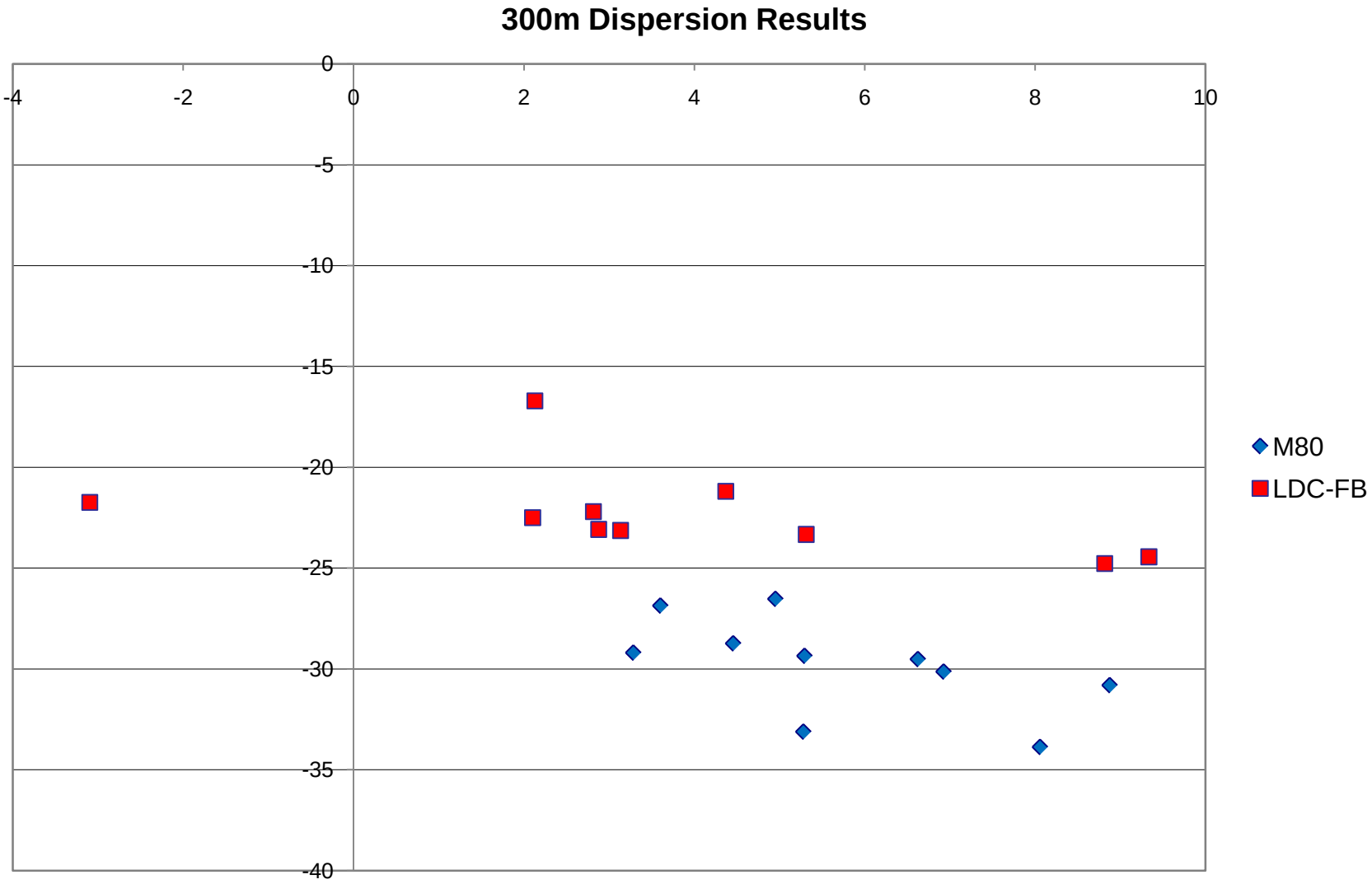
LC-FB

LDC-FB

Trajectory Comparison



300m Dispersion Test Results



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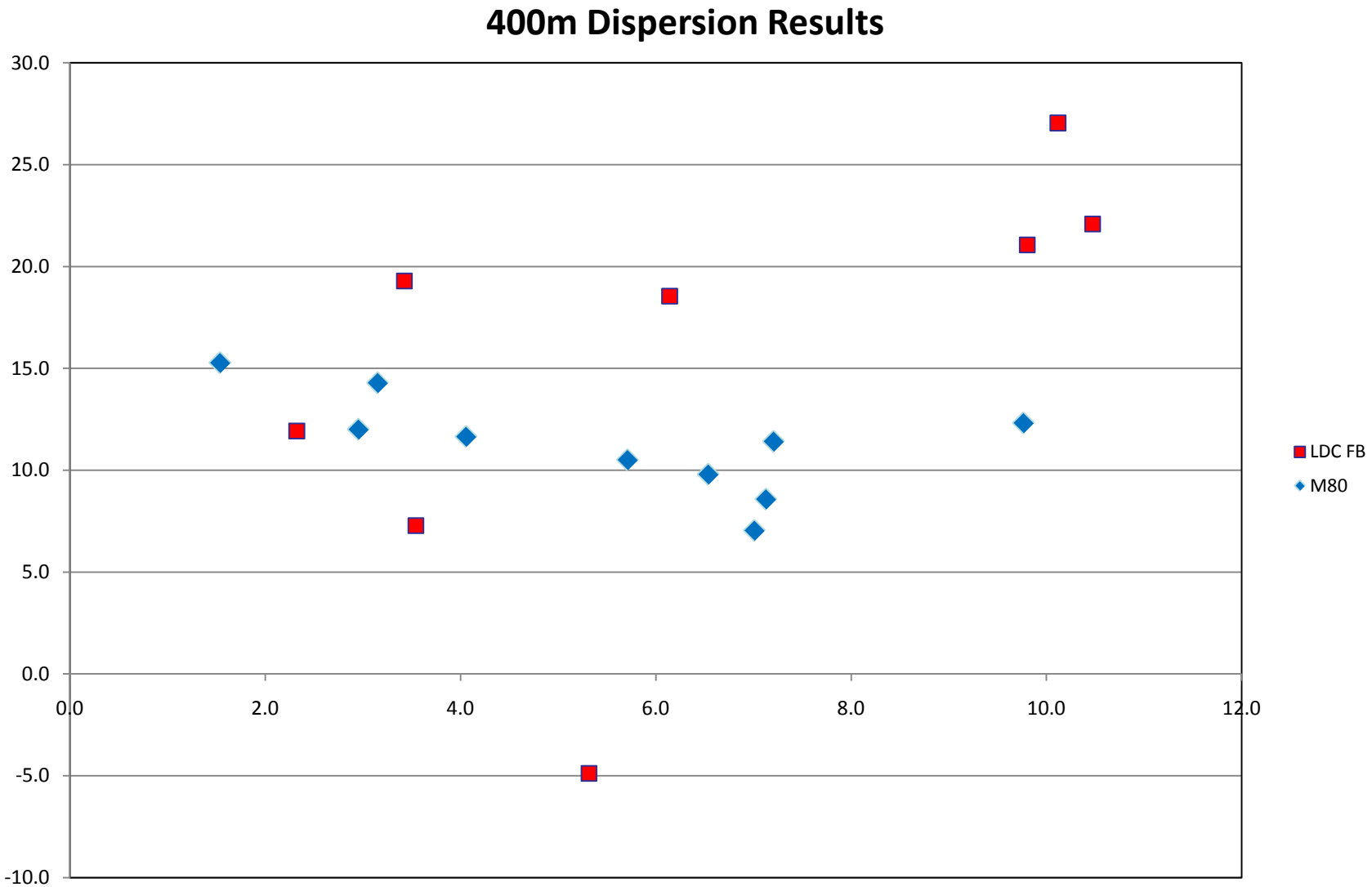
400m Dispersion Test Results



M240B Machine Gun Functioning

VIDEO

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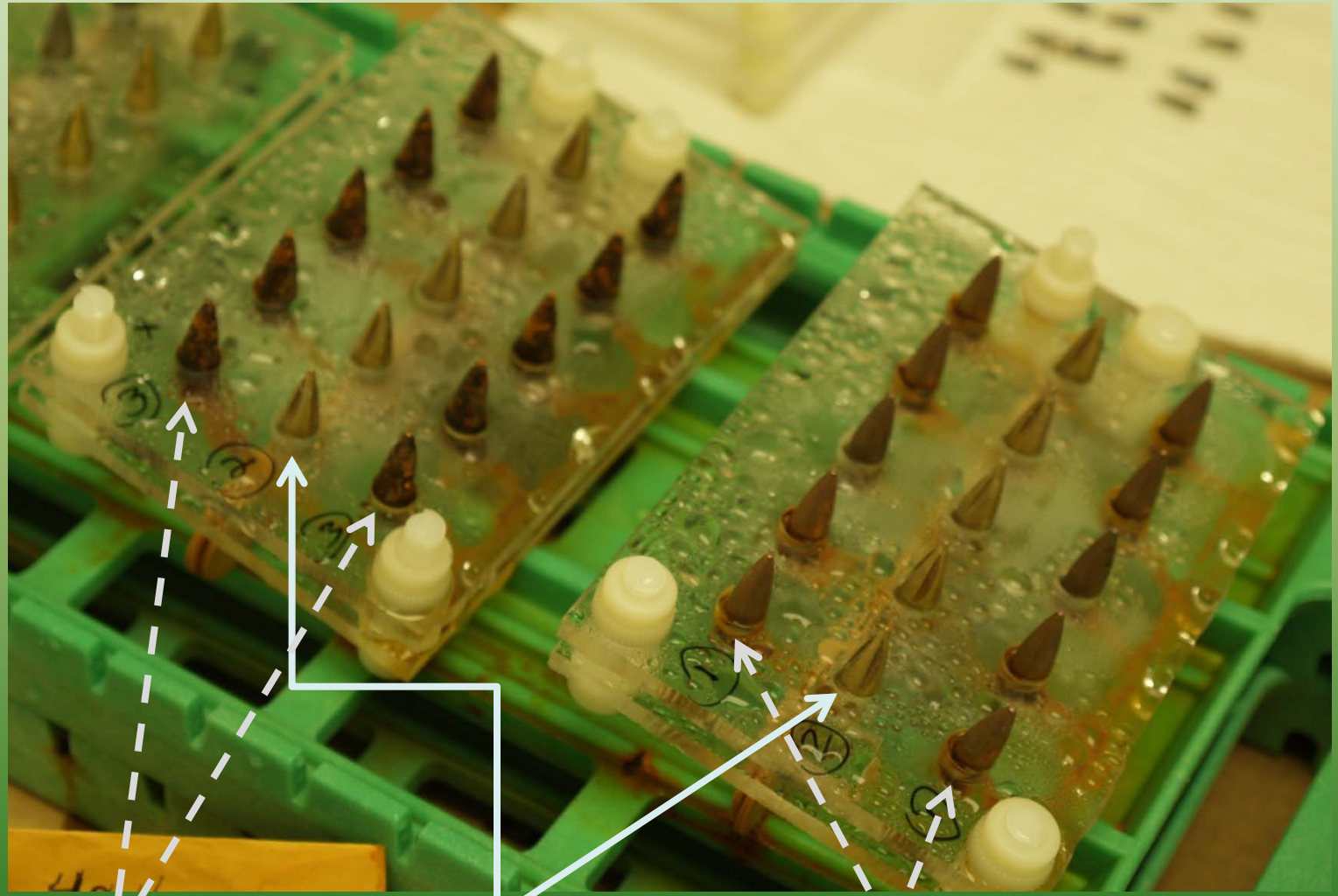
M14 EBR Rifle Functioning

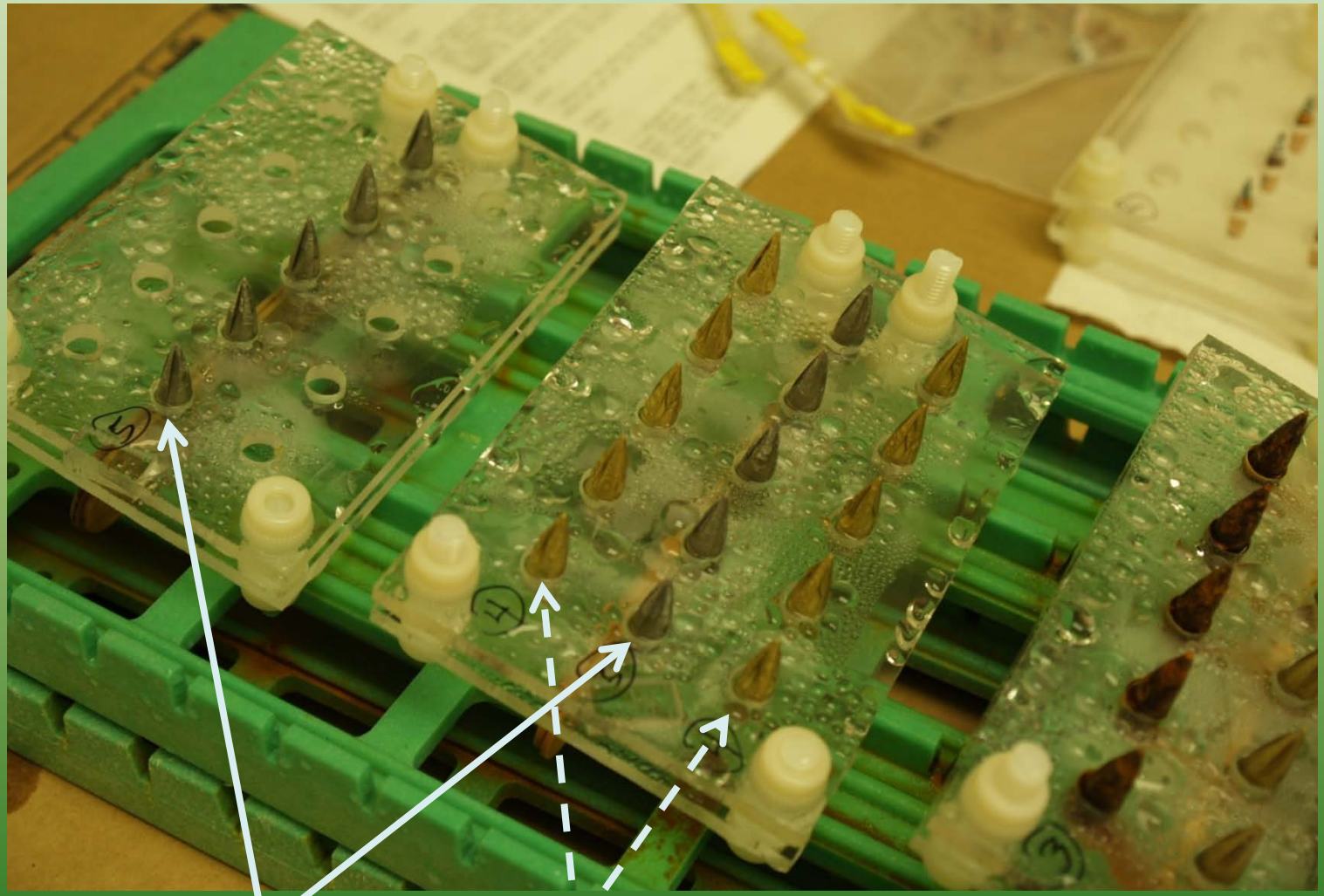
VIDEO

Salt-Fog-Humidity Chamber

Salt-Fog-Humidity Results



Salt-Fog-Humidity Results



Summary & Future Tasks

- Penetration 50%
- Threshold Max Range Requirement met
- Function requirement met
- 400m trajectory comparable to M80
- Brass Projectile better suited for Oceanic environment than M80
- Future Tasks
  - Find industry partner that is able to manufacture and load projectiles on a large scale
  - Evaluate Key Performance Parameters on larger scale

Questions?

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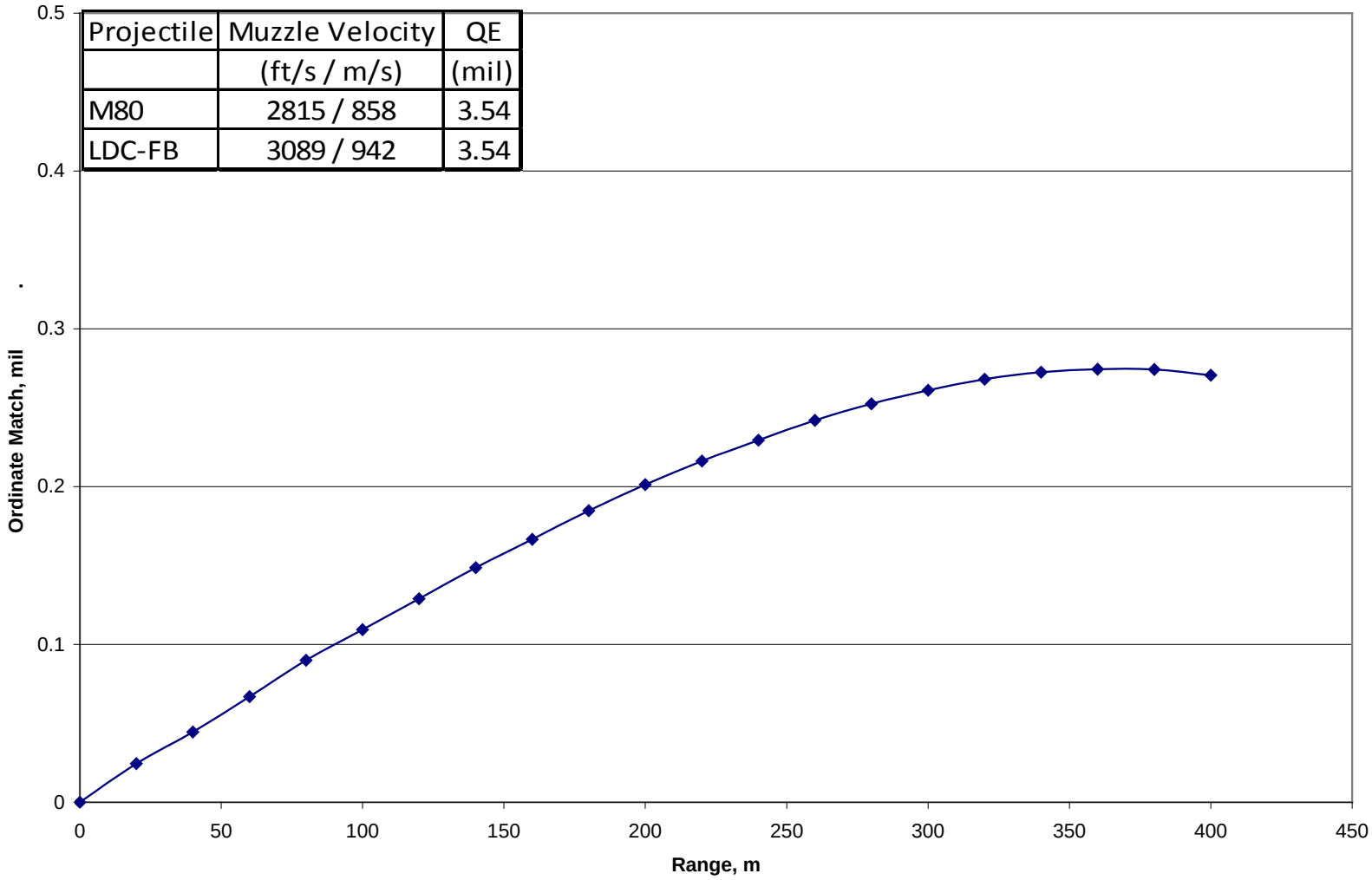
Ordinate Match Between LDC-FBT and M80 Ball

USCG L^2R^2

Ordinate Match Between LDC-FBT and M80

Projectile	Muzzle Velocity (ft/s / m/s)	QE (mil)
M80	2815 / 858	3.54
LDC-FB	3089 / 942	3.54

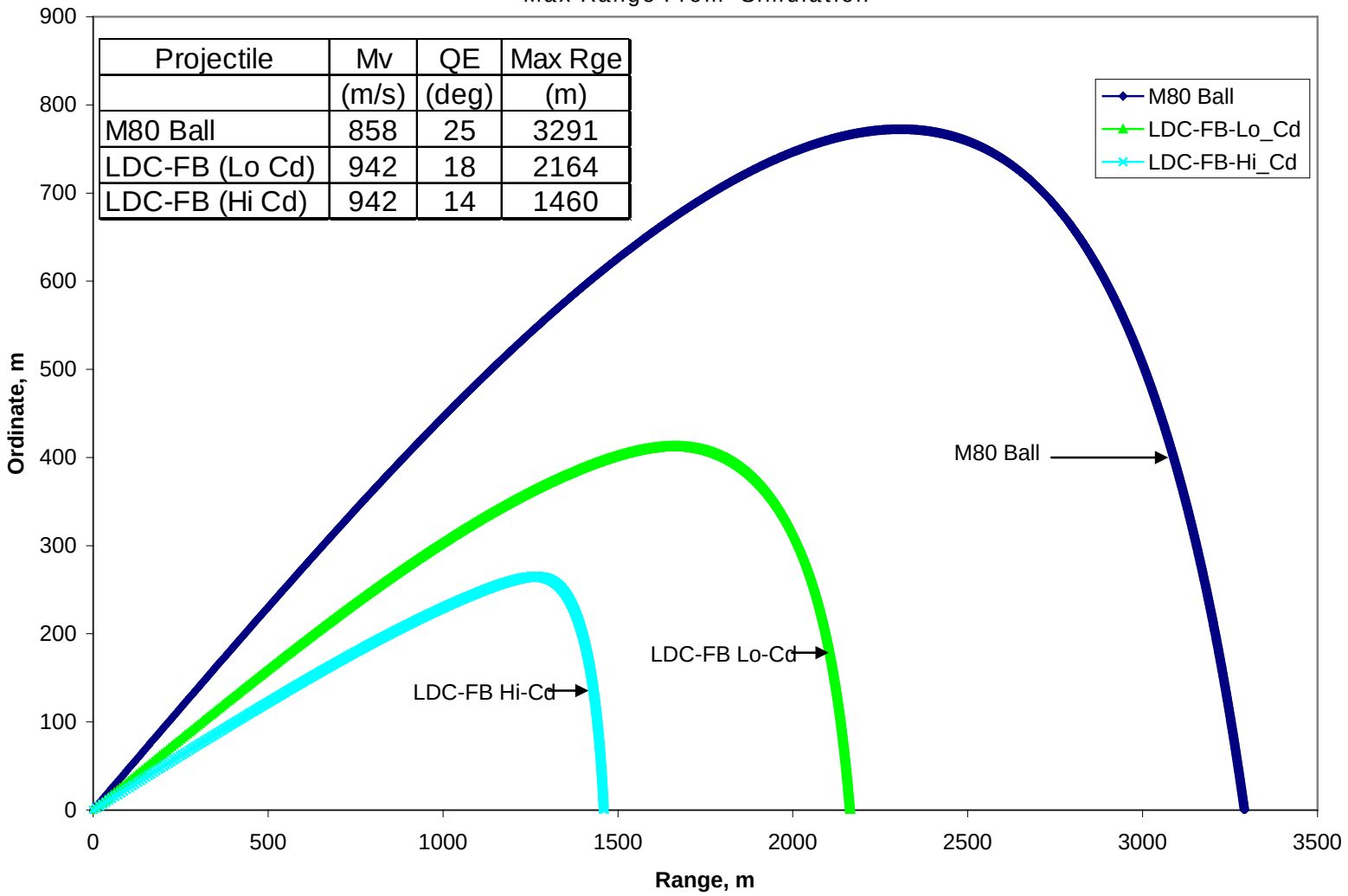


Maximum Range Simulation

USCG L^2R^2

Max Range From Simulation

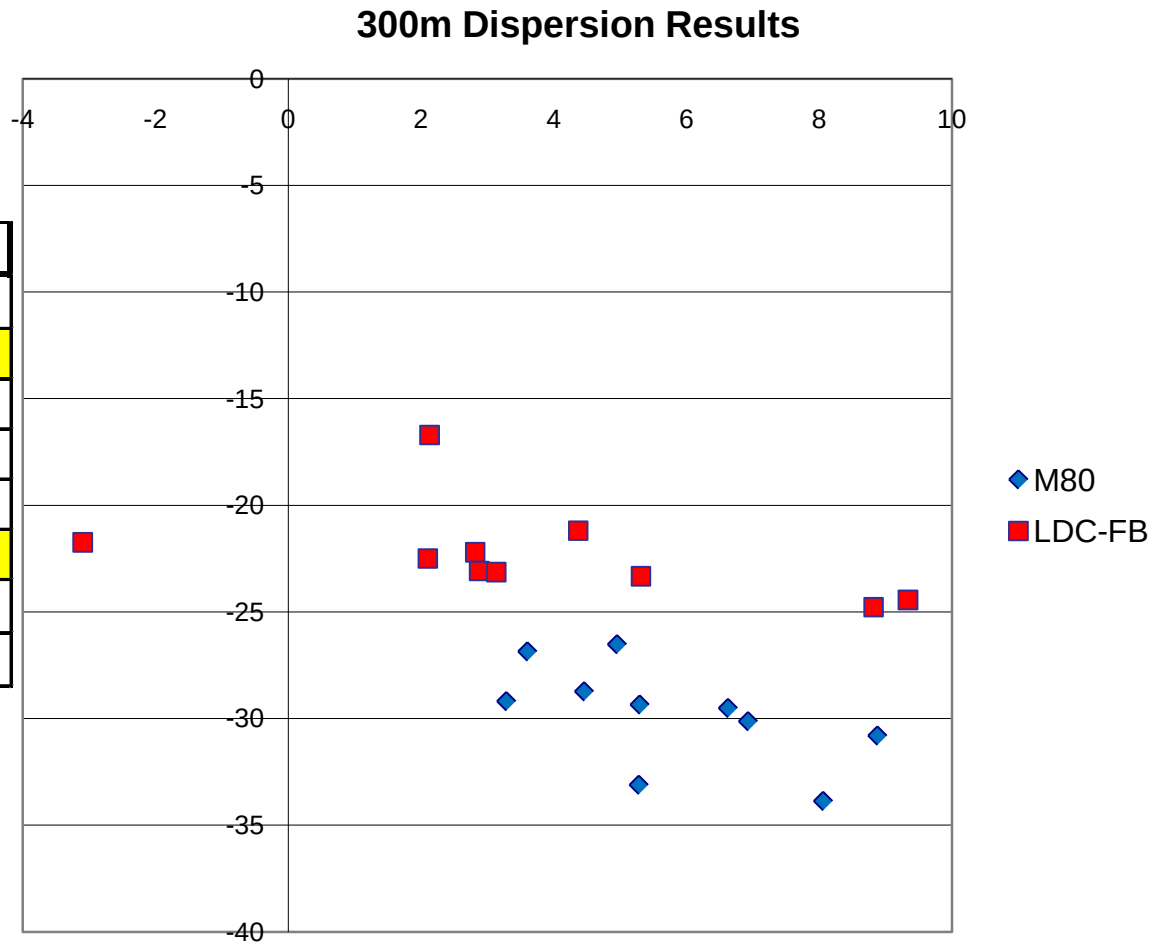
Projectile	Mv (m/s)	QE (deg)	Max Rge (m)
M80 Ball	858	25	3291
LDC-FB (Lo Cd)	942	18	2164
LDC-FB (Hi Cd)	942	14	1460



Note actual data from safety fan chart indicates that LDC-FB design meets max range requirement.

300m Dispersion Test Results

300m Dispersion Results		
Projectile	Mean Radius (in)	Mils
M80	2.53	0.22
M80 Brass	4.35	0.38
LDC-LF	8.03	0.69
LDC-NB	9.62	0.83
LDC-FB	3.23	0.28
LC-NB	5.82	0.50
LDC-SF	4.42	0.38



400m Dispersion Test Results

400m Dispersion Results		
Projectile	Mean Radius (in)	Mils
LDC-FB	8.6	0.75
M80	3.0	0.26