

**GENERAL DYNAMICS**  
Ordnance and Tactical Systems

**St. Marks Powder**  
**A General Dynamics Company**

May 9, 2007



# OBJECTIVE

- Develop and optimize BALL POWDER® Propellant to achieve an additional 130 feet per second over current offerings, but also offers added benefits such as:
  - ✓ Low flame temperature for extended barrel life.
  - ✓ Excellent ignition for low velocity standard deviation.
  - ✓ Flash suppression.
  - ✓ Lower charge weight for reduced fouling.

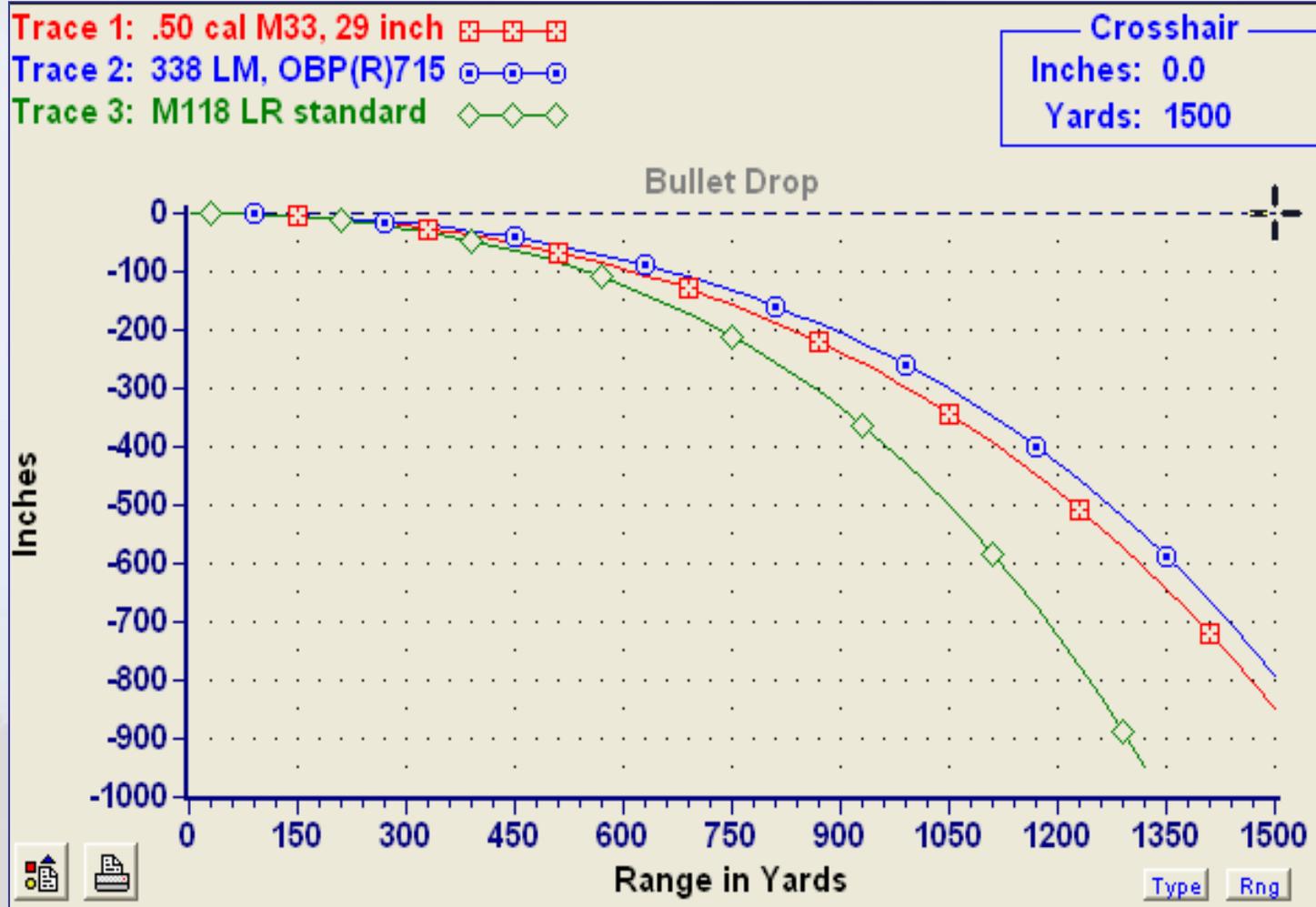
# .338 Lapua Magnum vs. M118 LR



# Weapon Constraints

- Weapon designed for 65,000 psi cartridge.
- Desired operating pressure of 62,500 psi.
- Optimized for single shot bolt action.
- 27.5 or 29.5 inch barrel.
- 1/10 twist barrel.
- Operating temperatures from +150° F to -20° F.
- Testing constraints from +150° F to -65° F.

# Relative Ballistics



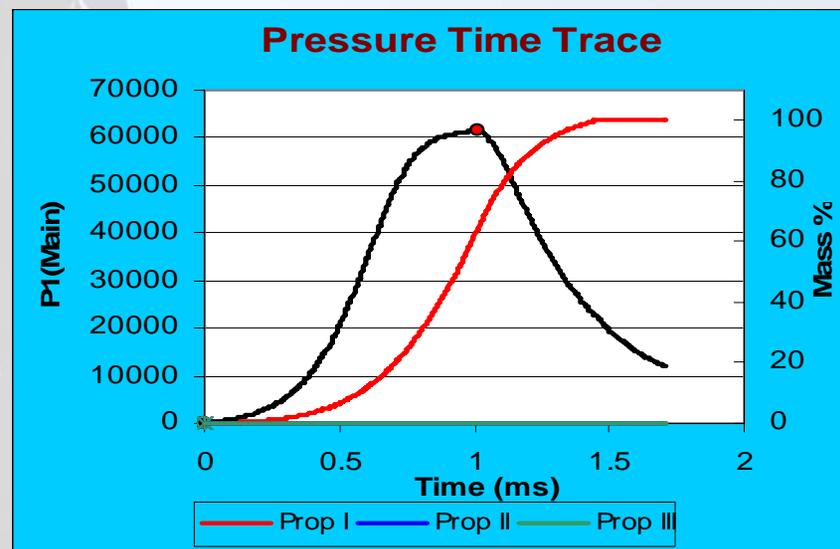
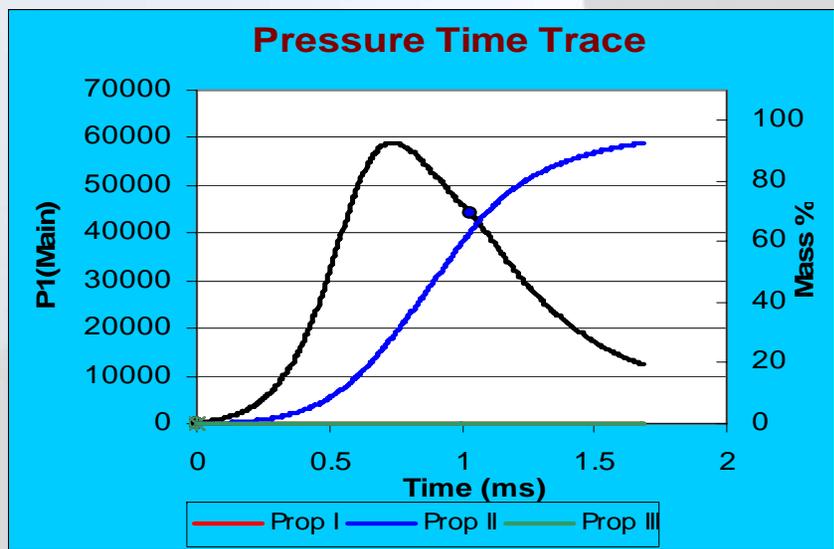
# .338 Lapua Magnum High Performance Program Baseline Ballistic Data, 24 inch Test Barrel

Competitive Propellant

Velocity: 2840 fps  
Pressure: 58800 psi  
Charge weight: 108 grains

St. Marks Powder OBP® 715

Velocity: 3030 fps  
Pressure: 62,200 psi  
Charge weight: 101.2 grains



## 338 Lapua Magnum High Performance Program 24 inch Test Barrel

- Ambient Velocity: 3030 fps
- Pressure: 62,200 psi
- Charge weight: 101.2 grains
  
- **Velocity change at temperatures:**
  - +80 fps at +125° F
  - 70 fps at -65° F
  
- **Velocity increase of 190 fps over competitors propellant.**
- **Energy increase of 14% over competitors propellant.**
- **Charge weight reduction of 7%.**

# Real World Ballistics (27.5 inch barrel for .338 Lapua Magnum)

## **.338 Lapua Magnum**

Velocity: 3160 fps

Ballistic Coefficient: 0.560

100 yard zero

3 MOA at 300 yards

9.75 MOA at 600 yards

22.75 MOA at 1000 yards

1095 ft-lbs energy at 1275 yards

## **M118 LR**

Velocity: 2620 fps

Ballistic Coefficient: 0.496

100 yard zero

5 MOA at 300 yards

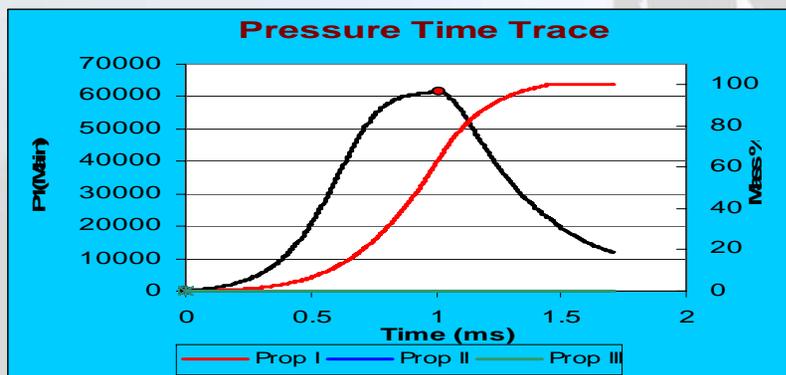
16 MOA at 600 yards

38 MOA at 1000 yards

1095 ft-lbs energy at 600 yards

# SMP® Propellant Technology

- Maximize area under the pressure/time curve.
- 100% propellant burn out.
- Near 100% loading density, but not over filled.
- Propellant optimized for temperature stability and maximum energy inside the cartridge case.
- Flash suppression integrated into propellant.
- Similar propellant chemistry has been DoD safety certified for 25mm M910 ammunition.



# RESULTS

- St. Marks Powder propellant achieved increased velocity over all US and European rounds available.
- St. Marks Powder propellant achieved excellent temperature stability.
- BALL POWDER® Propellant meters thru charge plates with precise charge weight repeatability, for consistent velocity in factory rounds, unlike extruded propellant.
- OBP® 715 contains flash suppression for sniper concealment.
- Low flame temperature ensures prolonged barrel life.
- Low charge weight ensures low residue and clean barrels.