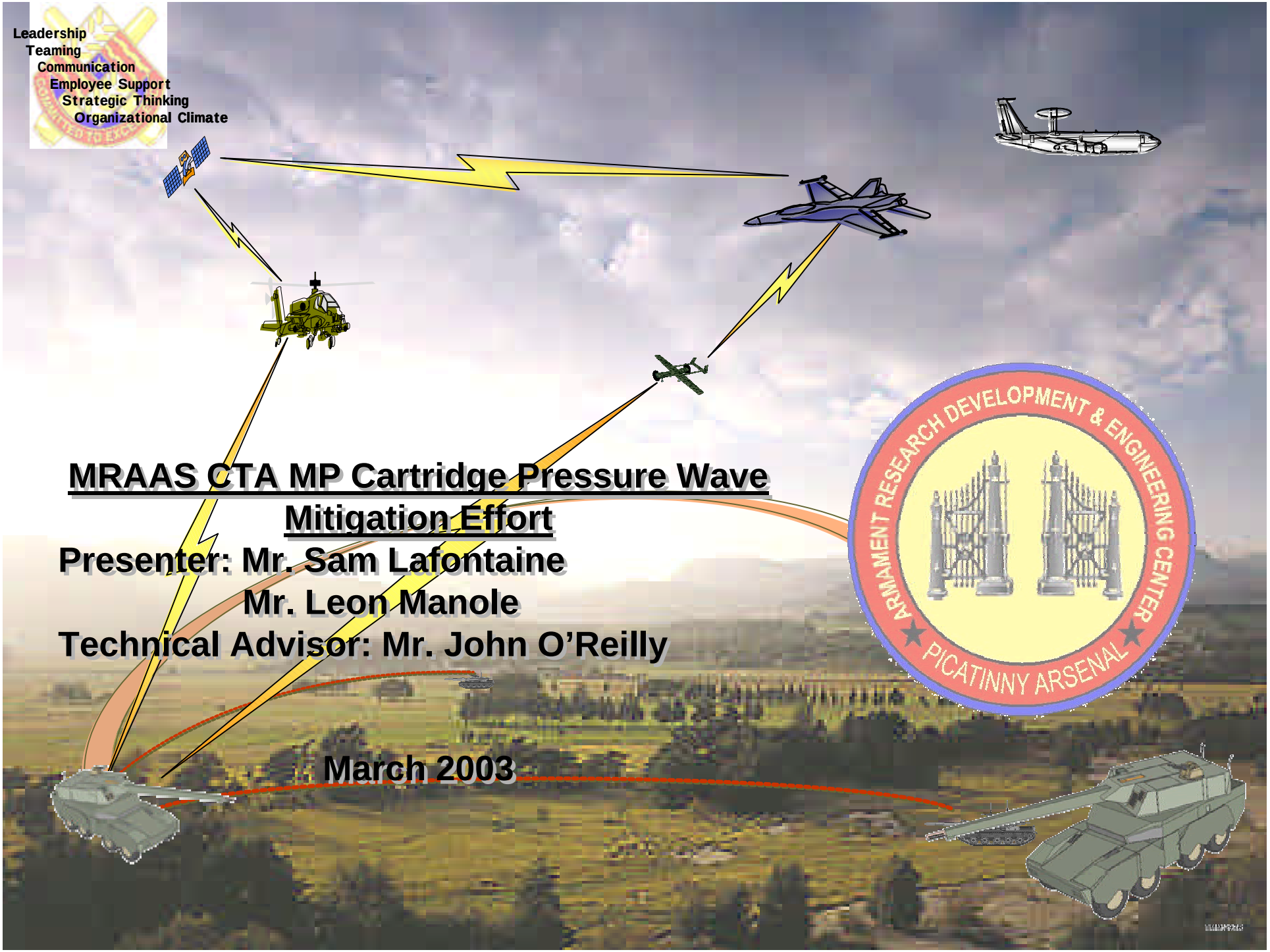
Leadership
Teaming
Communication
Employee Support
Strategic Thinking
Organizational Climate



MRAAS CTA MP Cartridge Pressure Wave Mitigation Effort

Presenter: Mr. Sam Lafontaine
Mr. Leon Manole
Technical Advisor: Mr. John O'Reilly

March 2003

ARMAMENT RESEARCH DEVELOPMENT & ENGINEERING CENTER
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MP Cartridge Cross-Section Description

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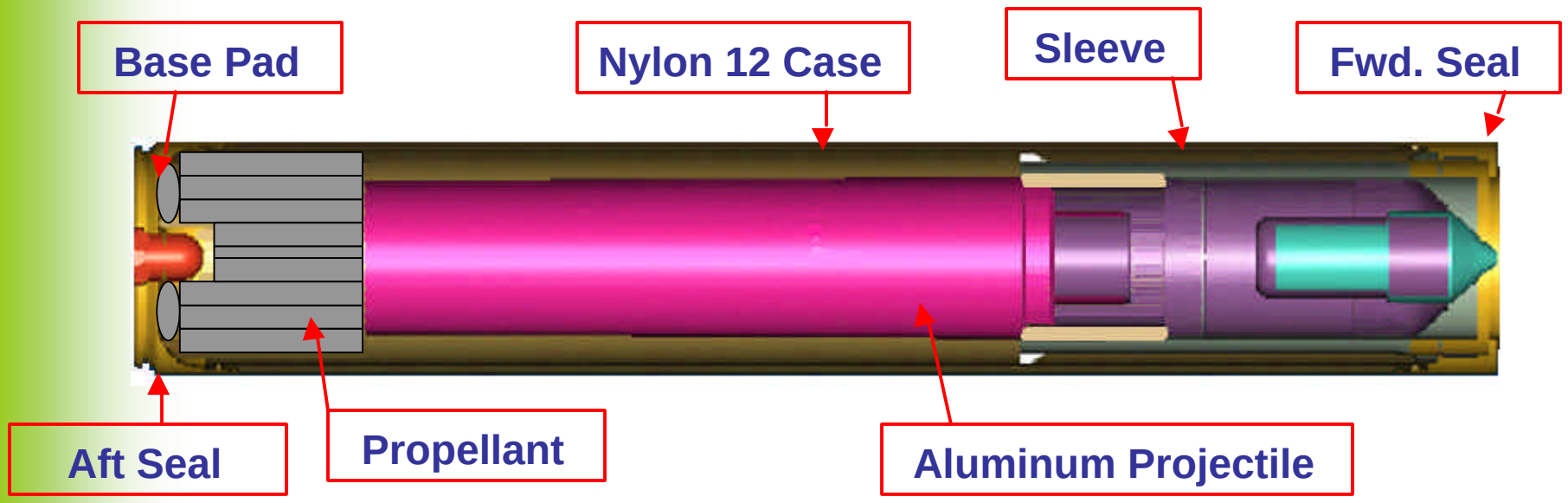

Initial Design

- M123A1 Primer
- Base Pad (Black Powder & CBI)
- JA2 19 Perf Stick Propellant

Background

Problem Description

- Ballistic testing confirmed severe pressure waves.
- Severe pressure waves observed from 10 to 30 ksi at 70 – 145 F for all firings.

Problem Theory

- Intrusion volumes into propellant bed can lead to localized ignition and the development of potentially damaging negative pressure waves.

Solution

- Softer ignition
- Exterior projectile redesign

MRAAS 105 mm CTA MP Pressure/Time Trace at 70 F

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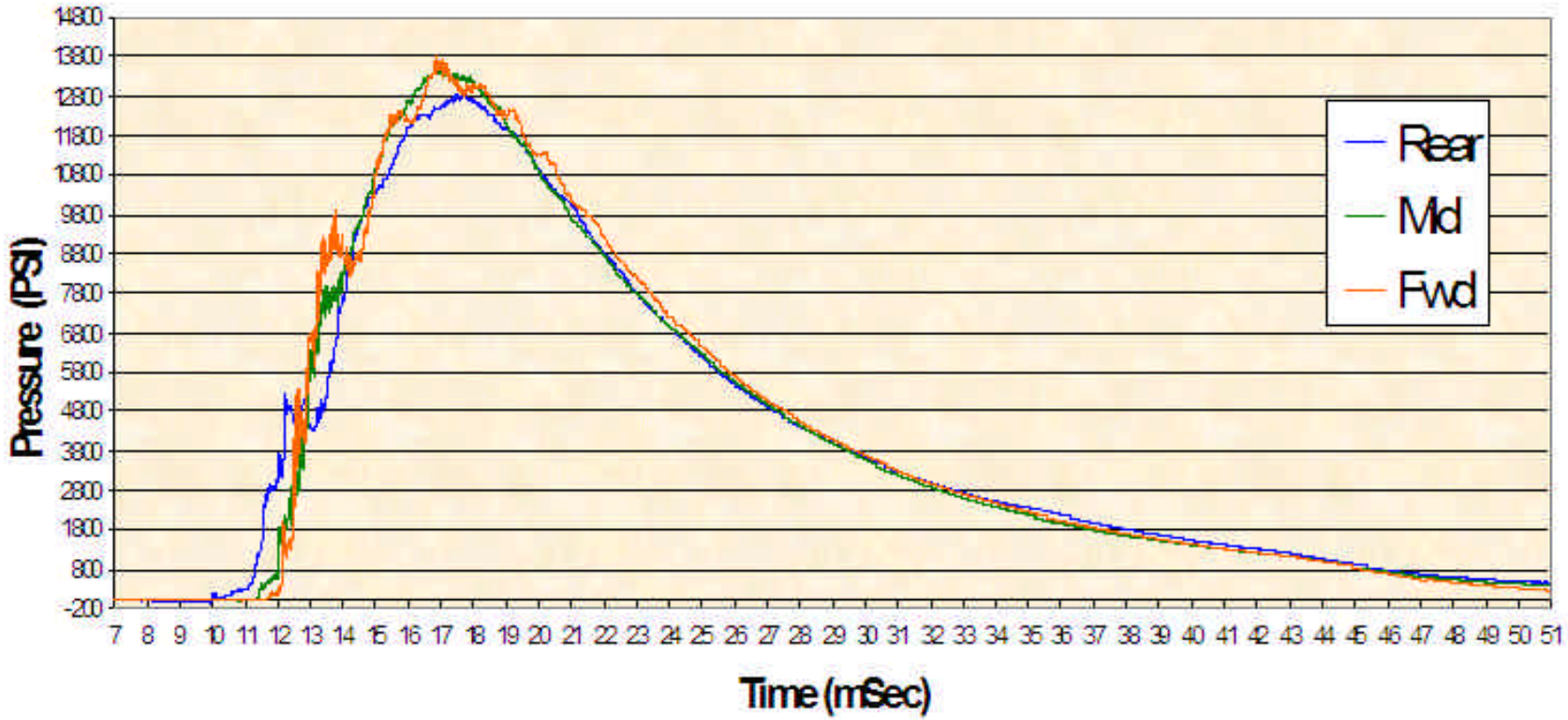
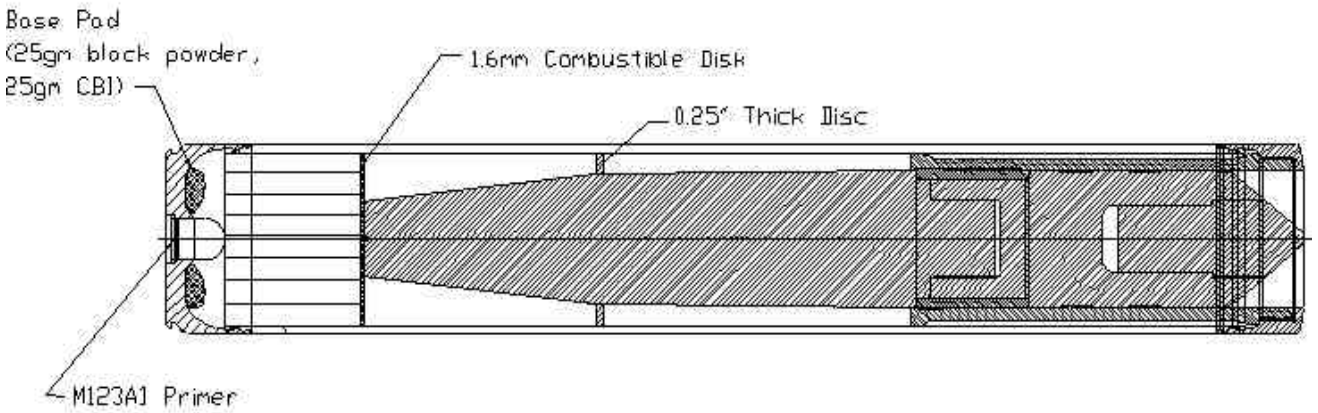
Initial Design

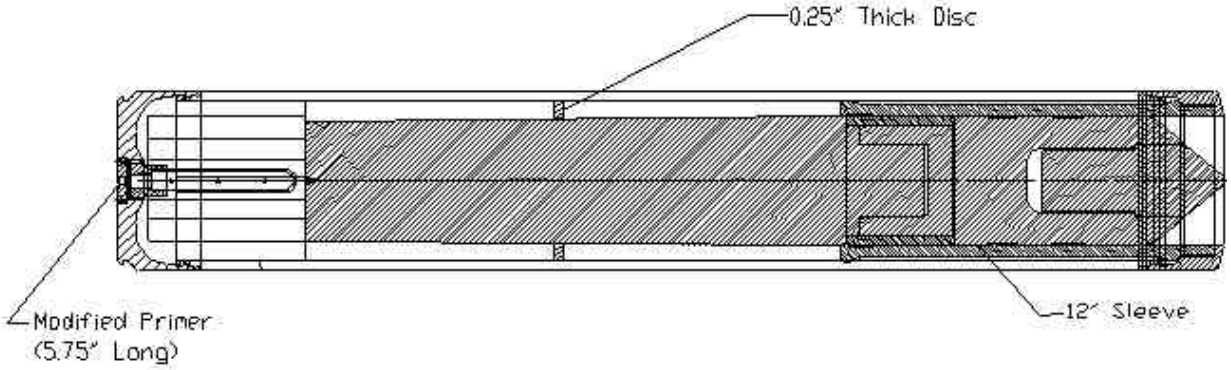


Cross Sectional View of MP Cartridge Proposed Solution

- **Projectile Redesign**



- **Softer Ignition: Longer Primer (M129 Mod.)**



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MRAAS 105 mm CTA MP Pressure/Time Trace at 70 F

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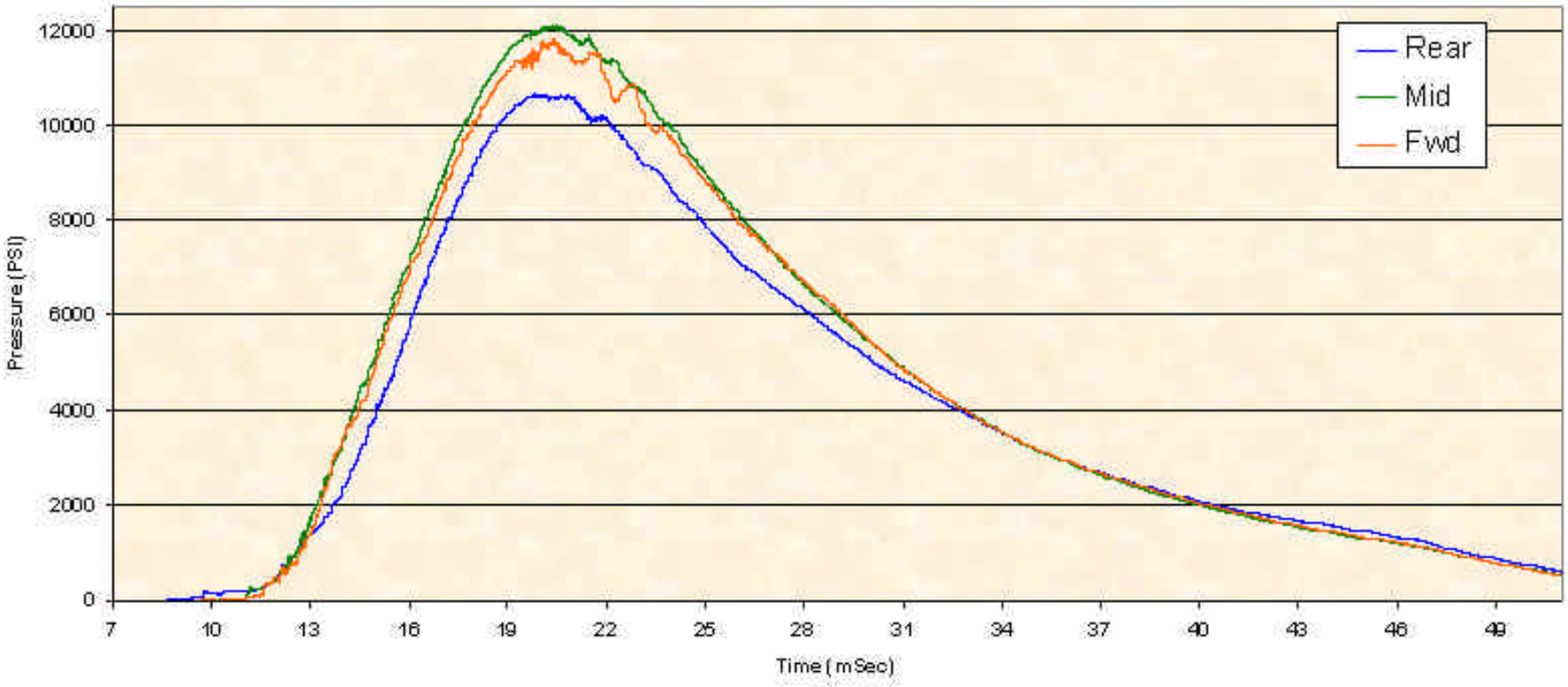
Boat-Tail Projectile



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MRAAS 105 mm CTA MP Pressure/Time Trace at 70 F

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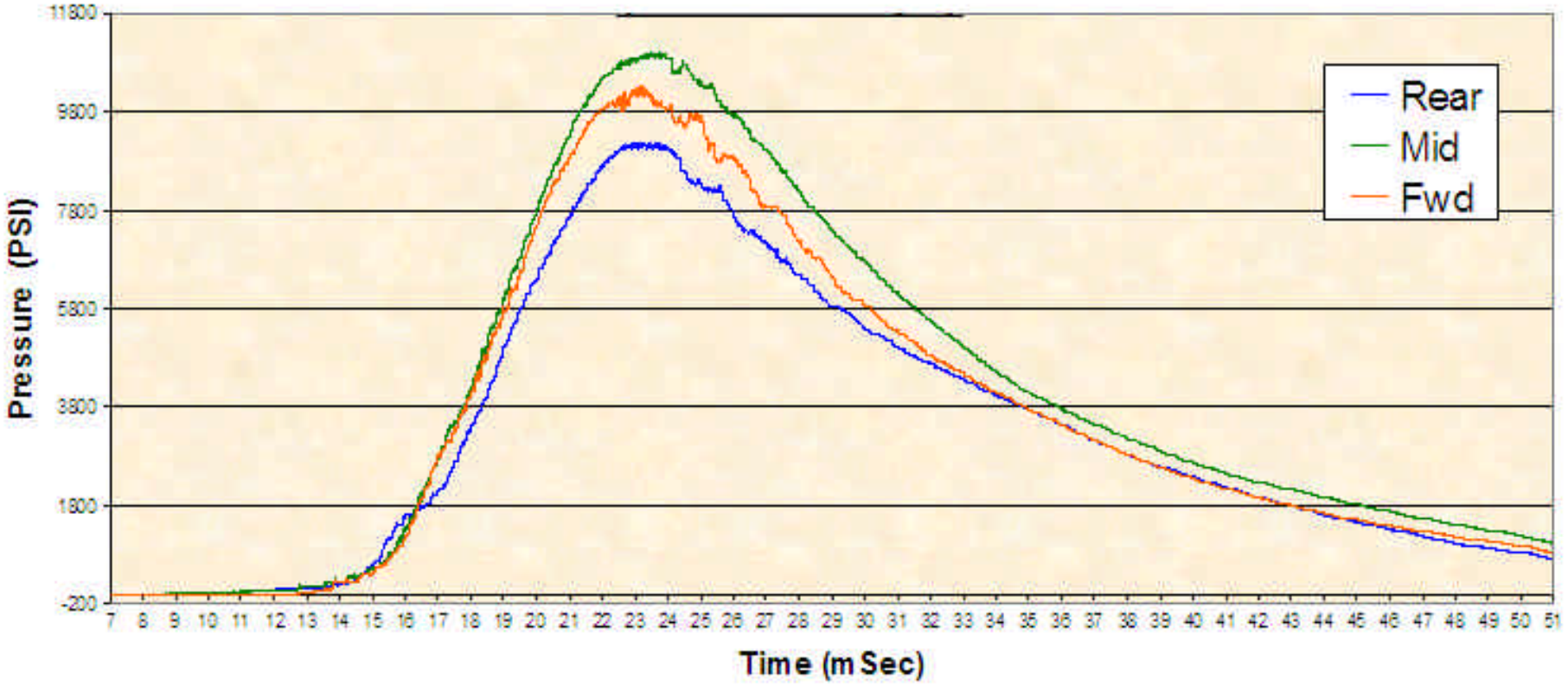
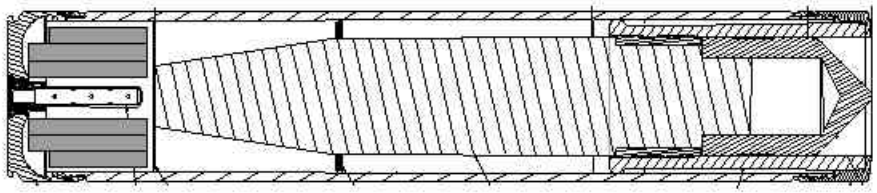
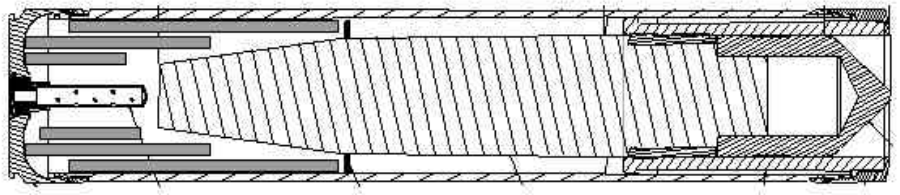
M129 Mod Primer



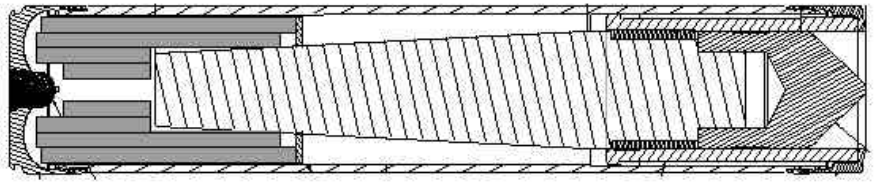
Future Designs To Mitigate Pressure Waves



- Boat Tail
- Perforated Combustible Disk
- M129 Mod Primer



- Boat Tail
- M129 Mod Primer
- Larger Charge



- Tail with Taper
- M123A1 Primer & BasePad
- Larger Charge