U.S. ARMY COMBAT CAPABILITIES DEVELOPMENT COMMAND – ARMAMENTS CENTER

155MM ARTILLERY PLATFORM PROJECTILE FALLBACK SENSOR

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Production and Sustainment Large Caliber

CLASSIFICATION

Classification: Unclassified

Distribution A: Approved for Public Release. Distribution Unlimited.

Briefing Type: Technology Needs

AGENDA

- NDIA 2019 Theme & Focus
- Modern US 155MM Platforms
- Fallback Definition
- M109 FoV Armament System
- Additional Challenges
- Path Forward
- Questions

NDIA 2019 THEME & FOCUS

“Leveraging Armament Technology Integration to Achieve Modernization, Overmatch, and Operational Readiness”

BLUF: Soldiers have no method of determining whether their round stays loaded after the breech is closed

- **US Government to identify technology that can detect the following:**
  - Poor Projectile Seating after Loading into chamber
  - Projectile Fallback

- **Currently no system requirement exists for fallback sensor**

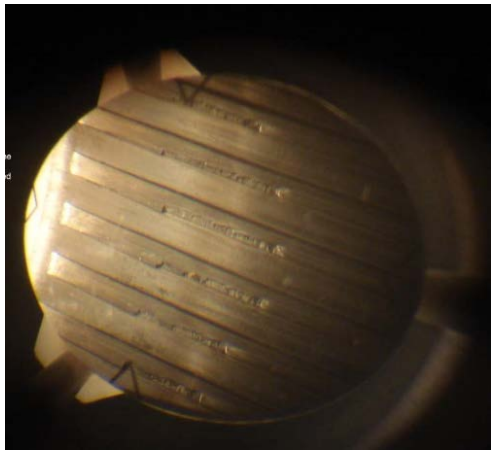
MODERN US 155MM HOWITZER PLATFORMS

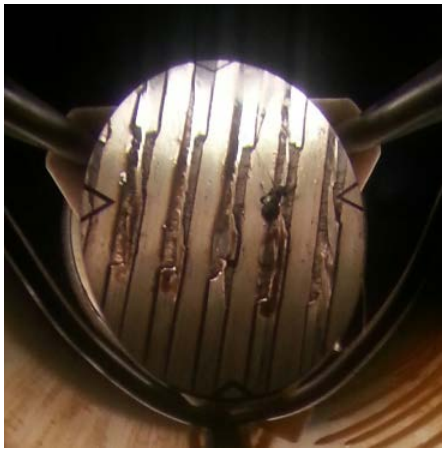
- **M777 Towed Howitzer**
  - 10,000lb, air drop capable
  - Manual crank to elevation
  - Hand-ram to load projectile
- **M109A7 Self-Propelled Howitzer**
  - 80,000lb armored vehicle
  - High Voltage drive system
  - Vehicle powered ram & hand-ram
  - Legacy Vehicles in the Field
- **Loading 155MM Projectiles**
  - Projectile pushed quickly into chamber
  - Projectile retained via interference with gun tube rifling
  - Propellant loaded separately
  - Screw-block breech is closed and primed to fire

FALLBACK DEFINITION

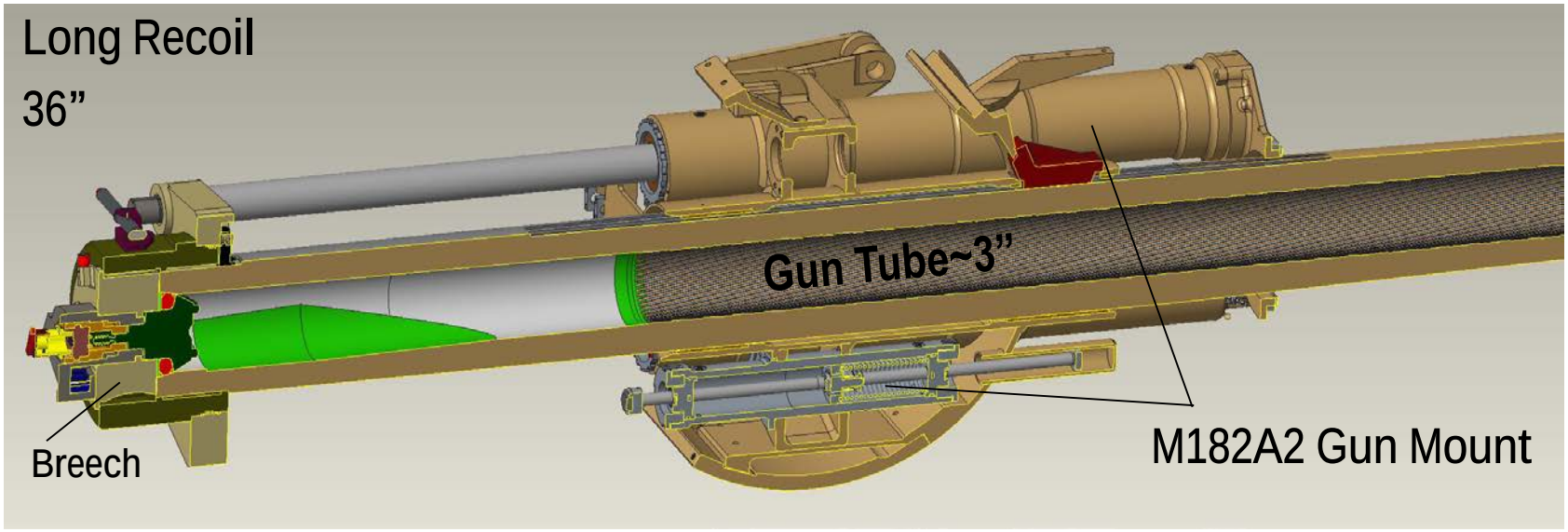
- **Projectile Fallback:**
  - Projectile is loaded such that seating isn't adequate
  - Propellant is loaded, breech is closed
  - Interference is unable to retain projectile when tube is elevated to fire
  - Projectile falls back onto propellant charges unnoticed
  - Crew fires fallen back round

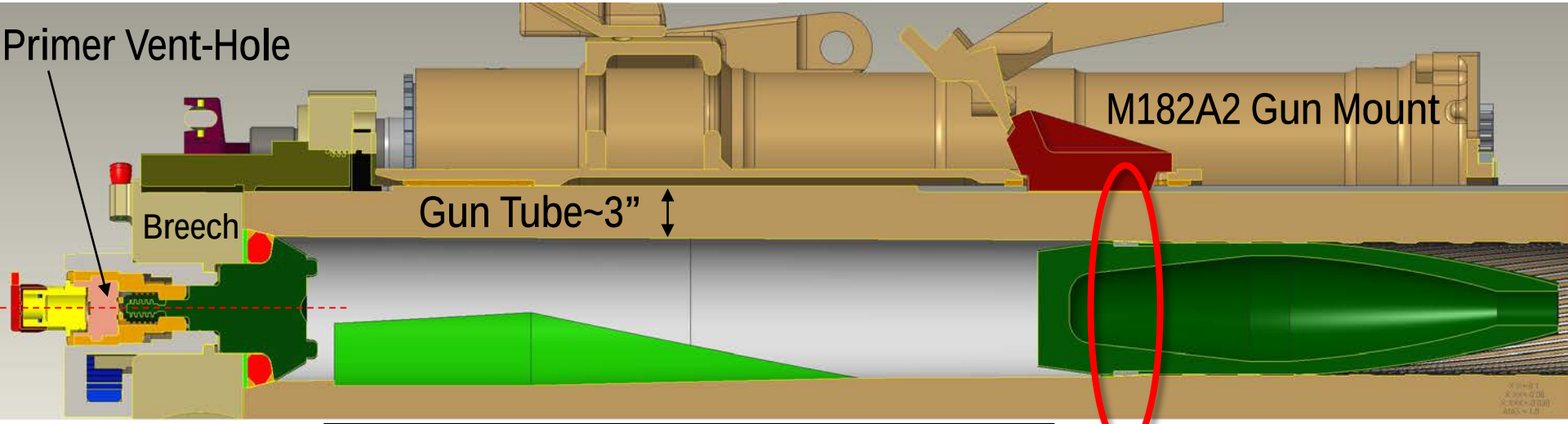
- **Consequence:**
  - Propellant gasses blow by the rotating band and obturator
    - Exposes projectile aft to higher pressures (potential in-bore detonation)
  - Remaining propellant gasses launch round so it collides with origin of rifling at an angle (potential gun tube damage)
  - Round exits gun and falls short of intended target increasing risk to friendly forces





M109 FOV ARMAMENT SYSTEM



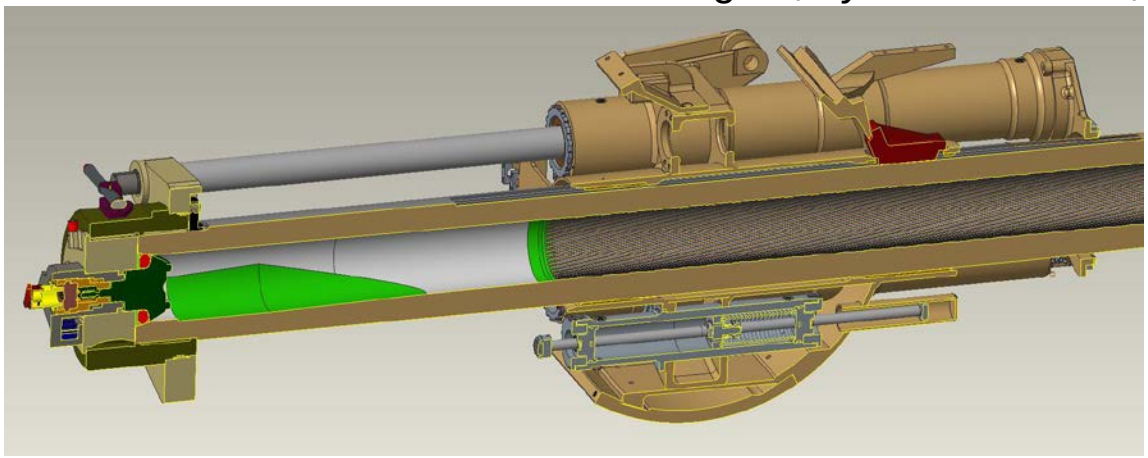


Loaded Round + Propellant are Isolated

ADDITIONAL CHALLENGES

- **In addition to sensing seating/fallback with closed breech, sensor must be:**
  - Compatible with several 155MM systems in their required range of operating environments
  - Compatible with all projectile and propellant types
  - Automated
  - Extremely reliable

- **“Good Seat” not well defined**
  - Soldiers believe they can hear a good seat
  - Fallback difficult to hear, dampened by propellant
  - Additional Vehicle Noise: engine, hydraulic motors, nearby firing howitzers, ect



PATH FORWARD

- **Obtain proposals from Industry (August 2019)**

- **Feasibility Test(s) Complete (December 2019)**
  - Simulate Projectile Fallback
  - Capture Data Live
  - Data reduction and Analysis
  - Present to Government

- **Longer Term Initiative to Integrate Armament Solution**
  - Into Howitzer Systems: Legacy, Current, and Future

QUESTIONS

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