

# Combustion Light Gas Gun

## CLGG

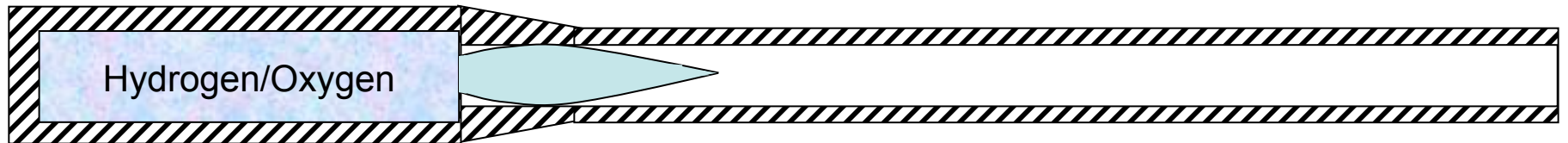
Progress Update  
April 8, 2008

*UTRON*



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## CLGG Physics



*The lighter propellant gases keep the pressure behind the projectile higher*

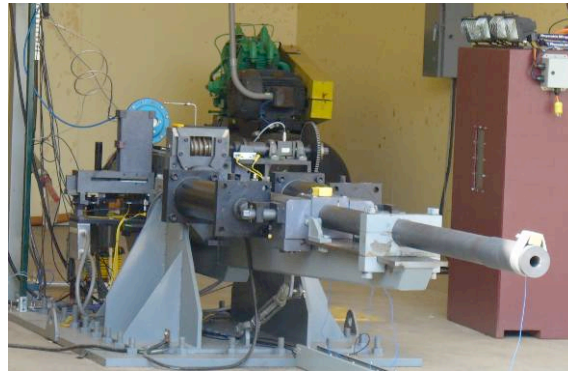
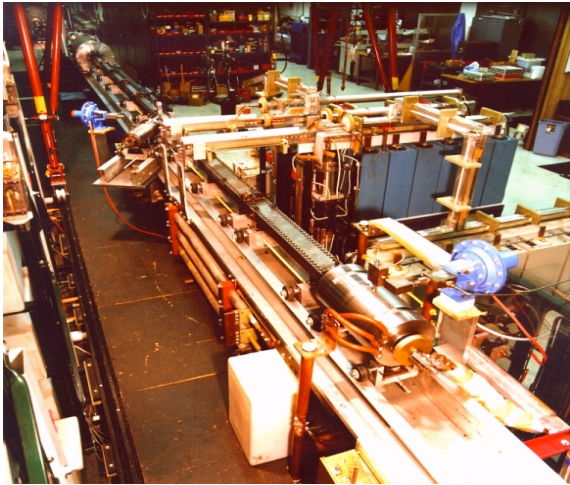
# CLGG Chronology

Time

1993

1995 →

2007 →



Bore Size

16 mm

45 mm

155 mm

Kinetic Energy Levels

kJ's

Few MJ's

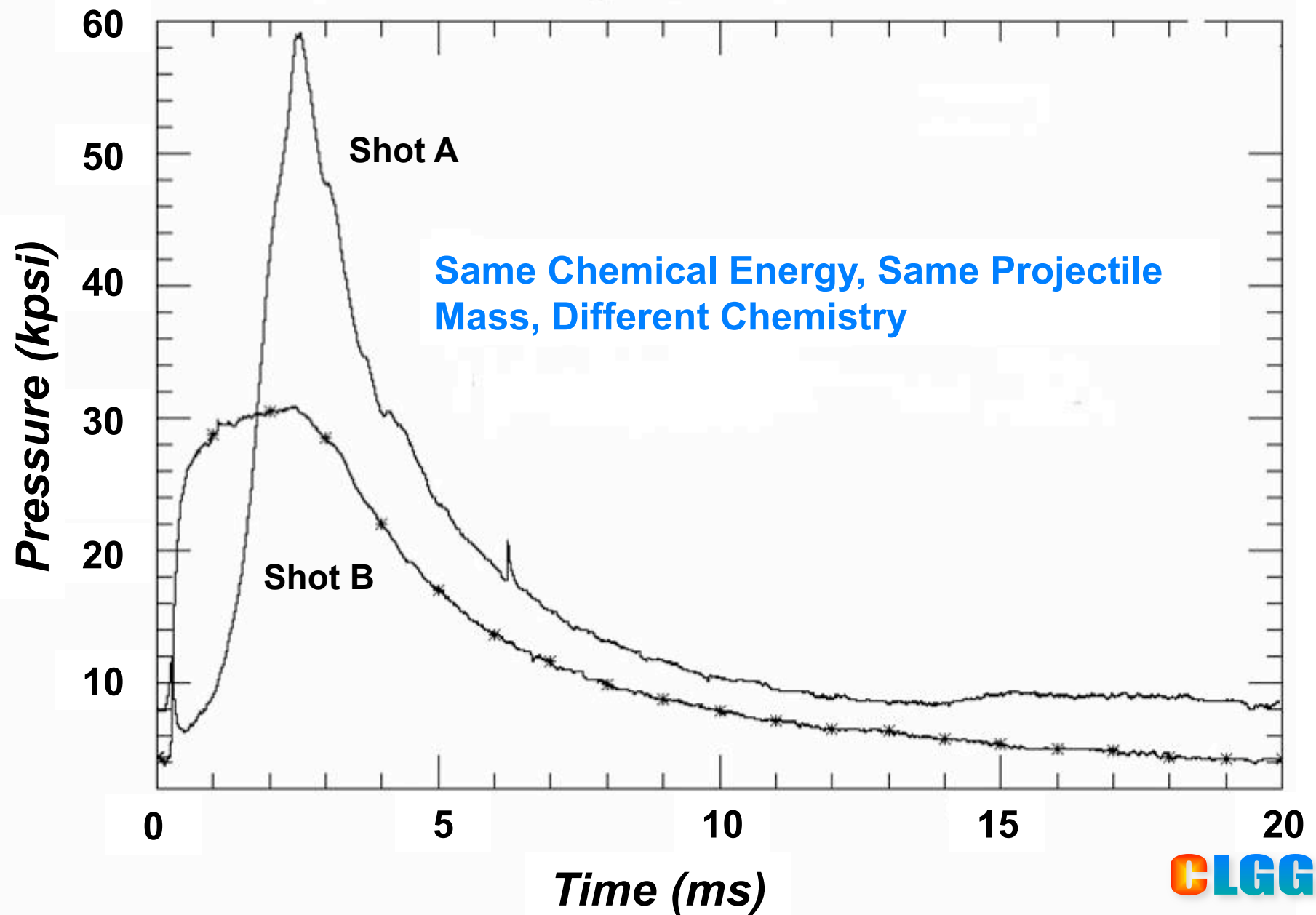
Tens of MJ's

## CLGG Benefits

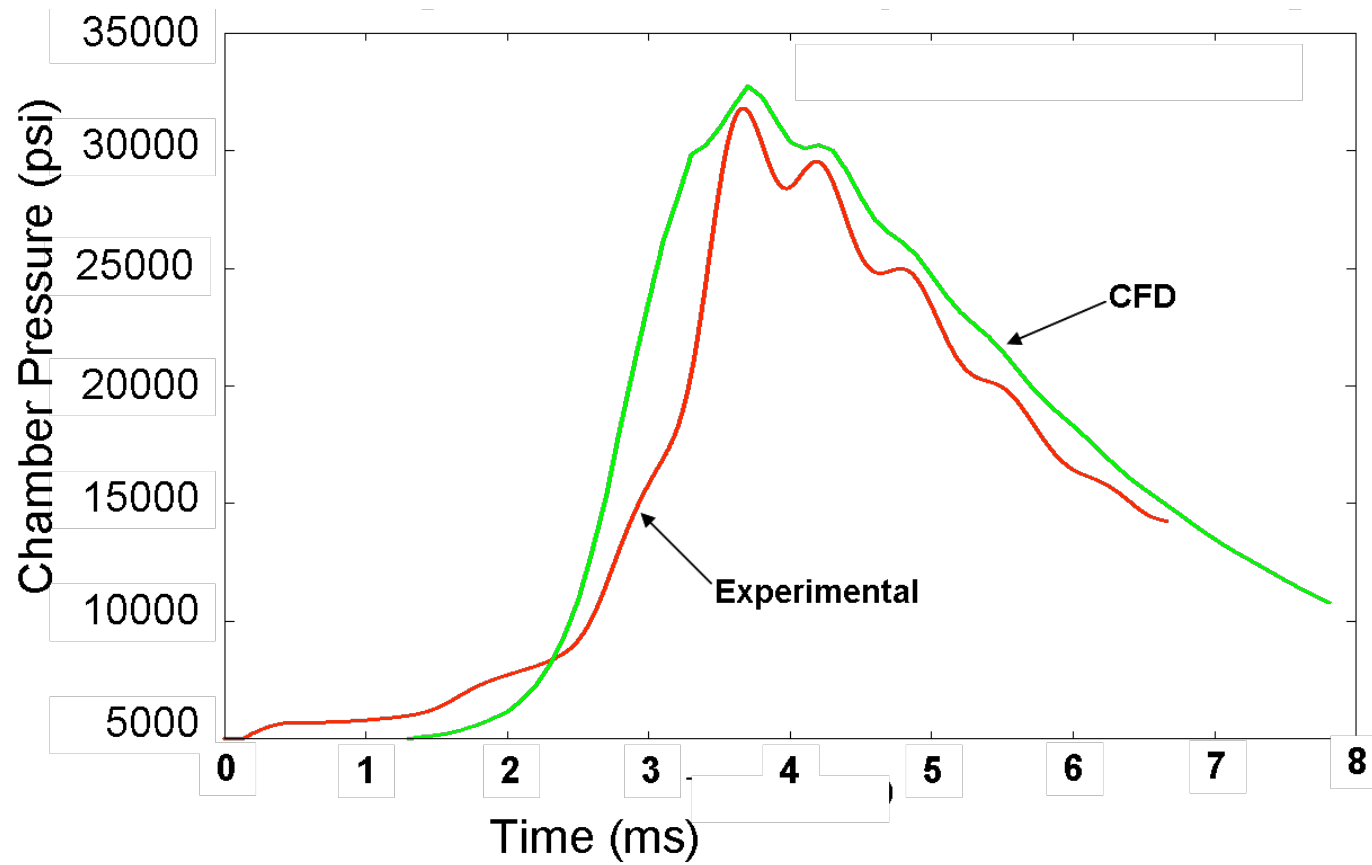
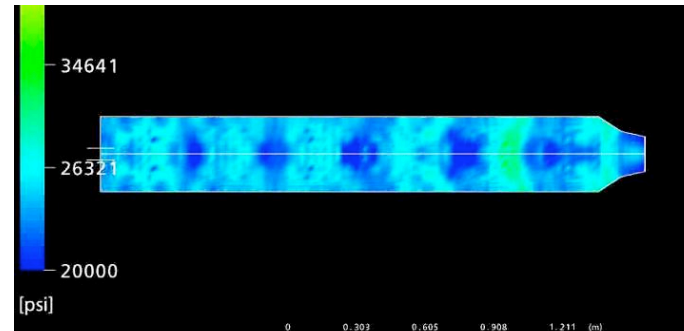
- Higher velocity
- Lower operating pressures
- Lower acceleration on projectile
- Infinite zoning
- Ability to produce propellant onsite



## Combustion Control and Zoning



## Modeling





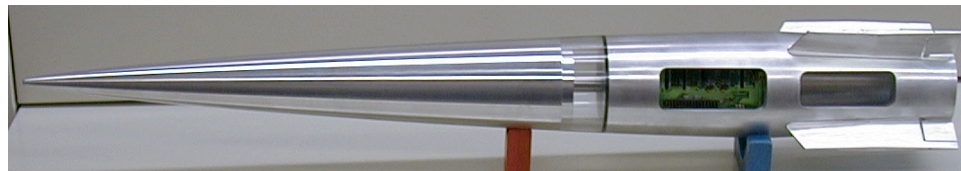
## 155 mm CLGG

14 shots with up to 28 MJ muzzle energy to date,  
A fraction of its capability, tests are ongoing



## 155mm Test Data

Shot number	Projectile mass (kg)	Peak Chamber Pressure (psi)	Peak Acceleration (g's)	Velocity (m/s)	Kinetic Energy (MJ)	Barrage Range (miles)
14	20.3	25,000	17,000	1667	28	111





## Current Propellant Supply System



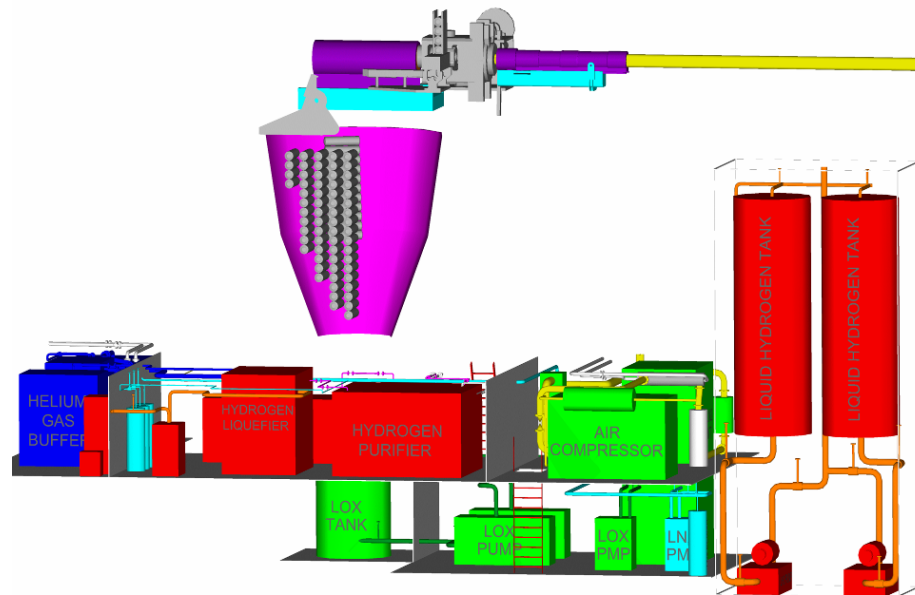
# Future Propellant Production – Pilot Plant

## Hydrogen Production

- Steam Natural Gas Reforming
- Diesel Reforming
- Electrolysis

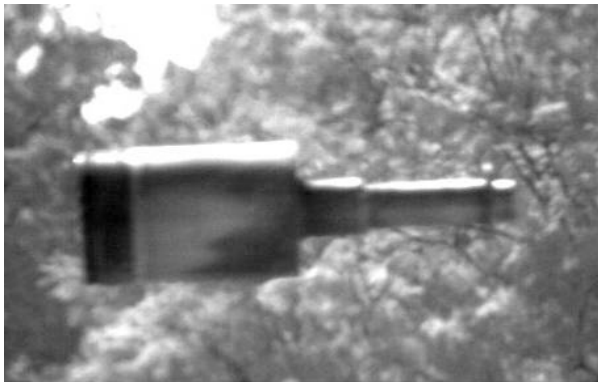
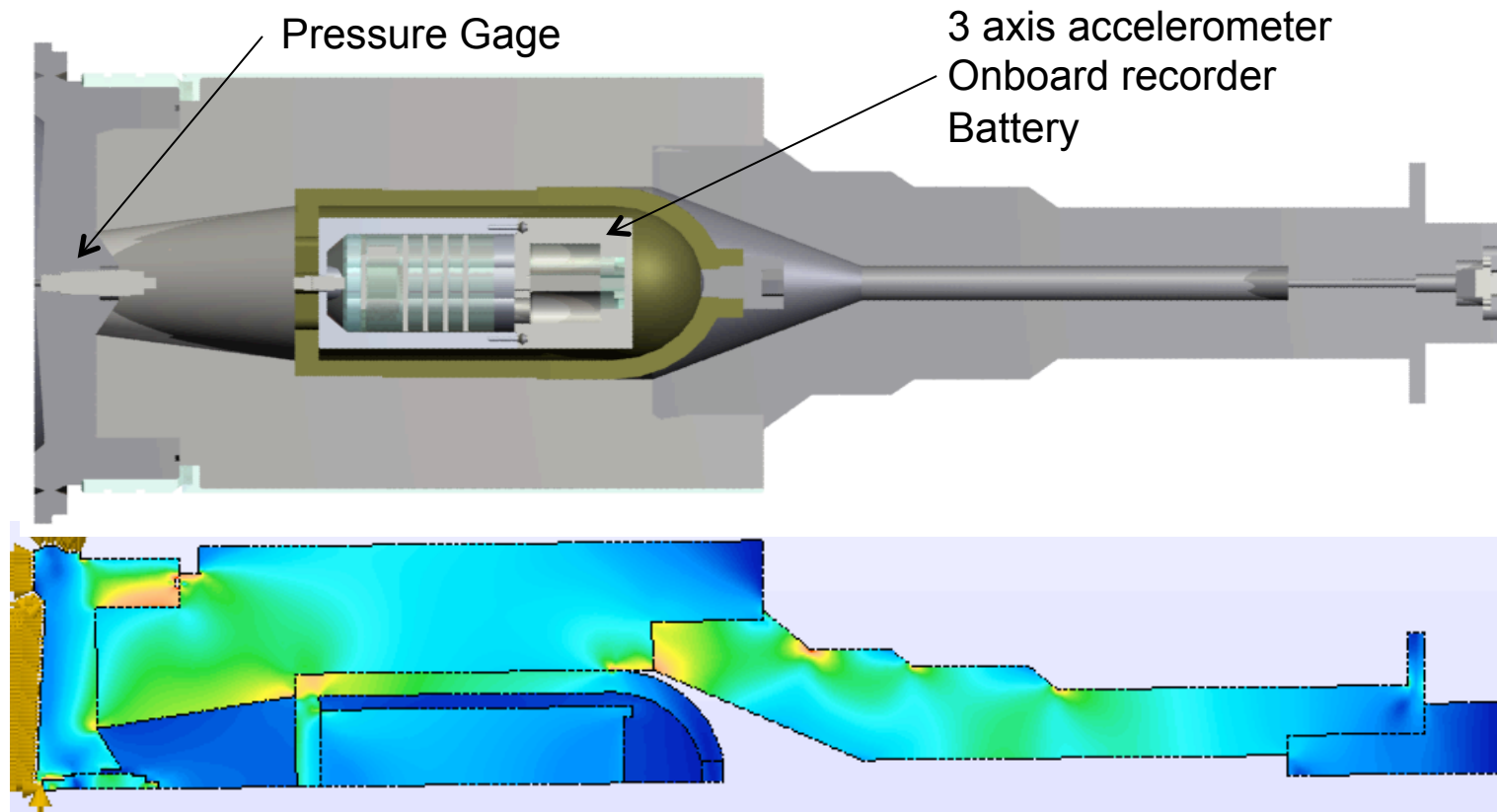
## Oxygen Production

- Electrolysis
- Cryogenic Air Separation
- Pressure Swing Absorption
- Membrane Separation



Possible pilot plant using off the shelf hardware

## Future – Instrumented Projectiles



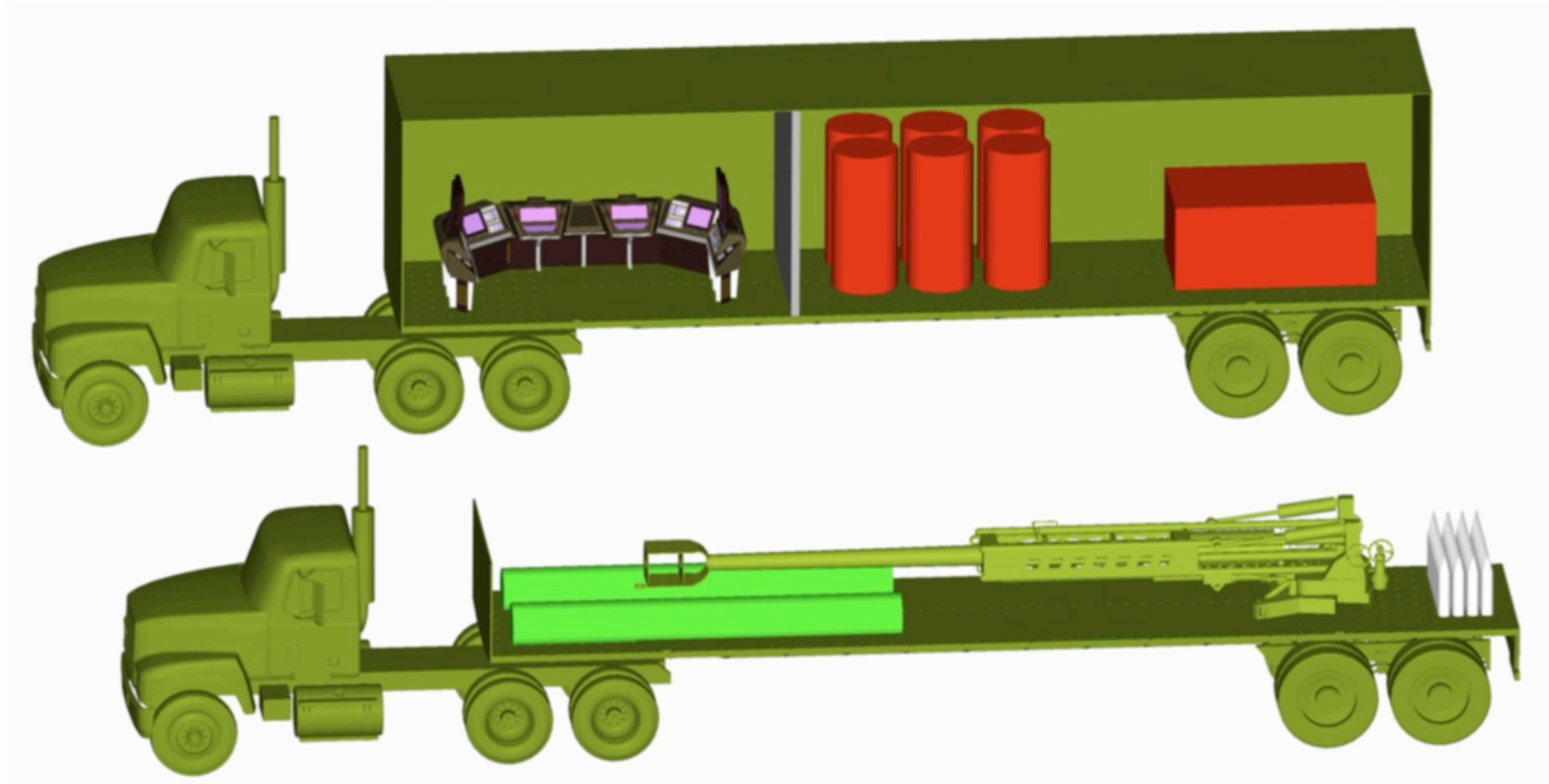


## Future – Instrumented Projectiles





## Future – Transportable Extreme Range System



- R&D - Support Long Range Guided Projectile Development
- Field - Provide Extreme Range Artillery Support



CLGG

