

Combustion Light Gas Gun

CLGG

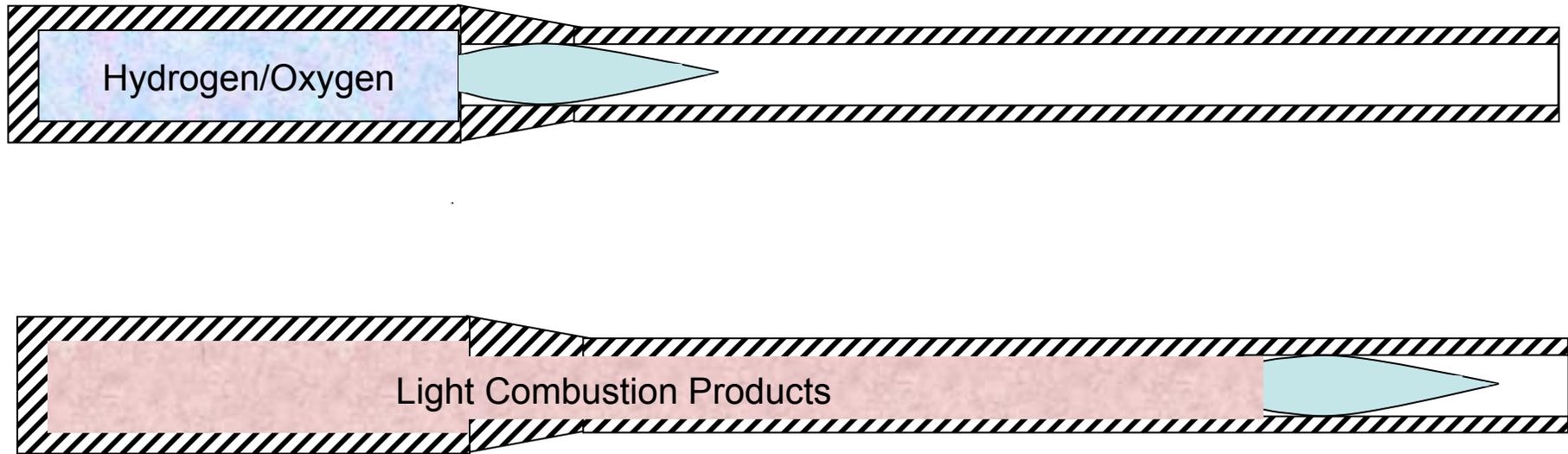
Progress Update
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UTRON



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CLGG Physics



The lighter propellant gases keep the pressure behind the projectile higher

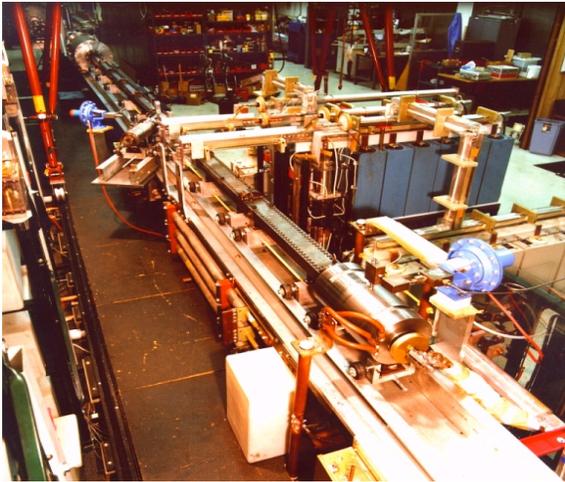
CLGG Chronology

Time

1993

1995 →

2007 →



Bore Size

16 mm

45 mm

155 mm

Kinetic Energy Levels

kJ's

Few MJ's

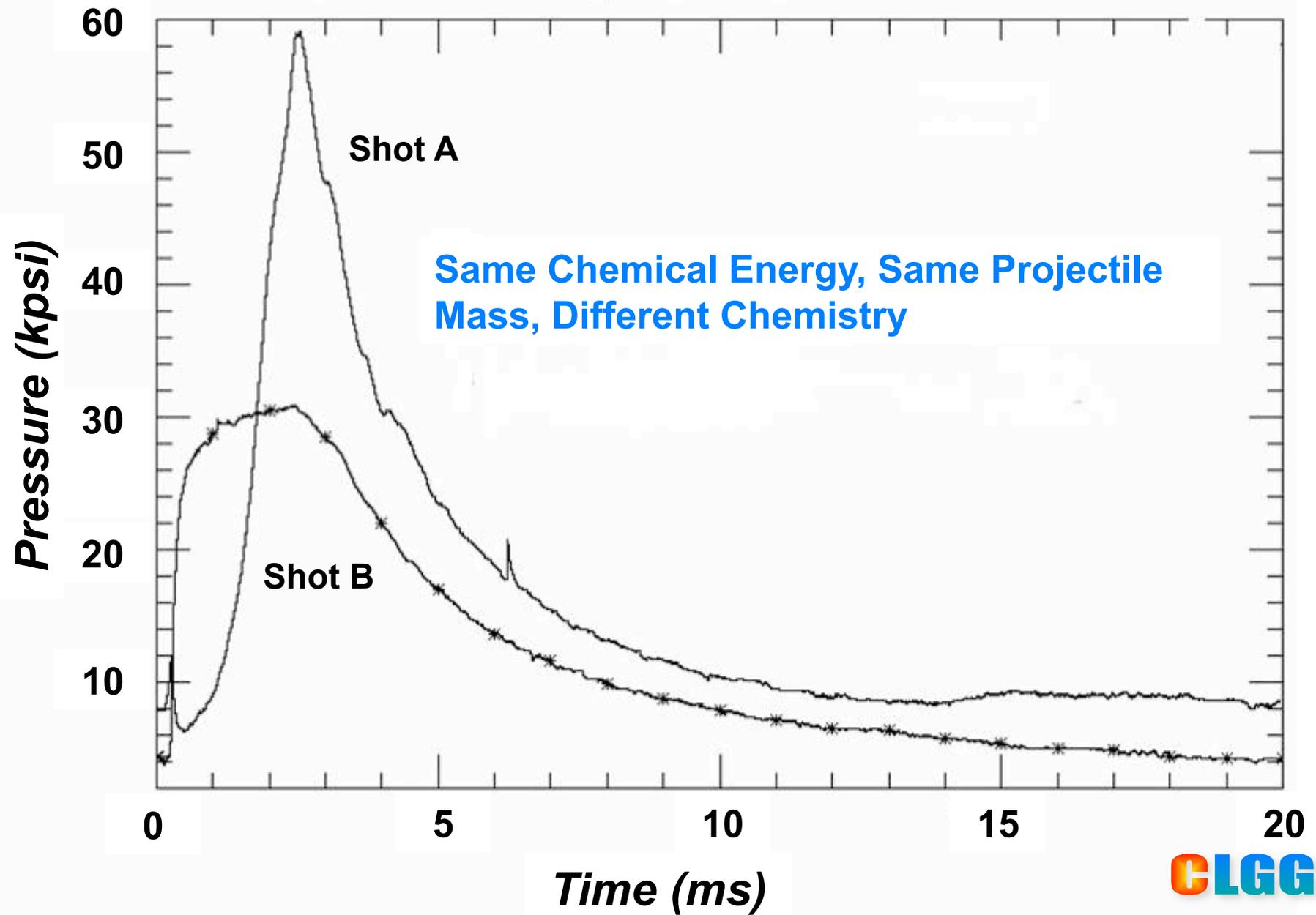
Tens of MJ's

CLGG Benefits

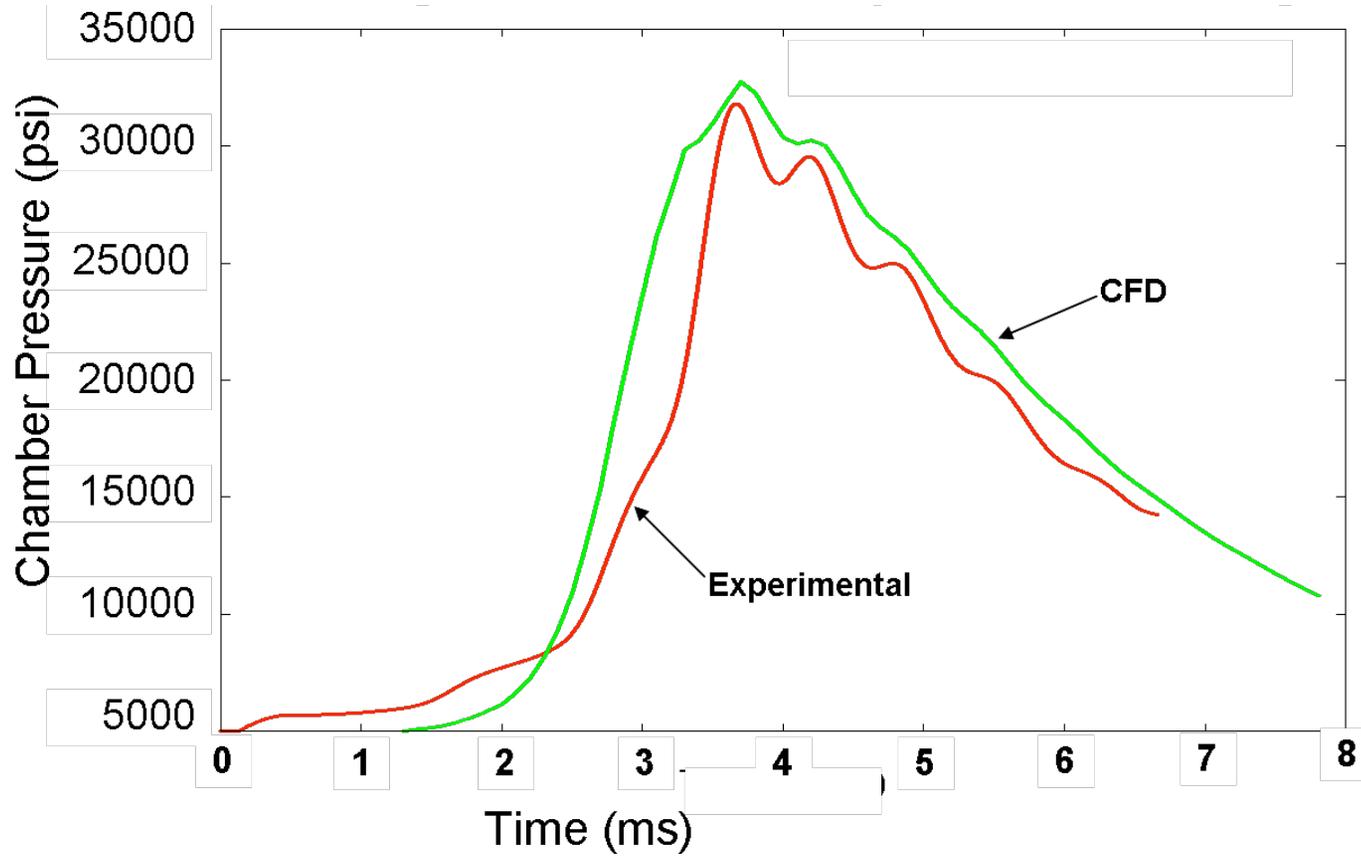
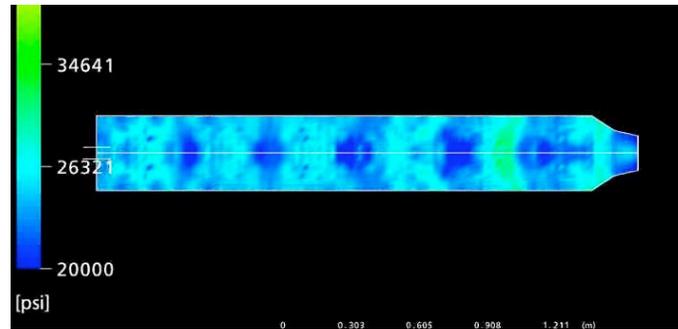
- **Higher velocity**
- **Lower operating pressures**
- **Lower acceleration on projectile**
- **Infinite zoning**
- **Ability to produce propellant onsite**



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

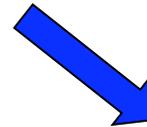
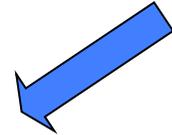


155mm Test Data

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



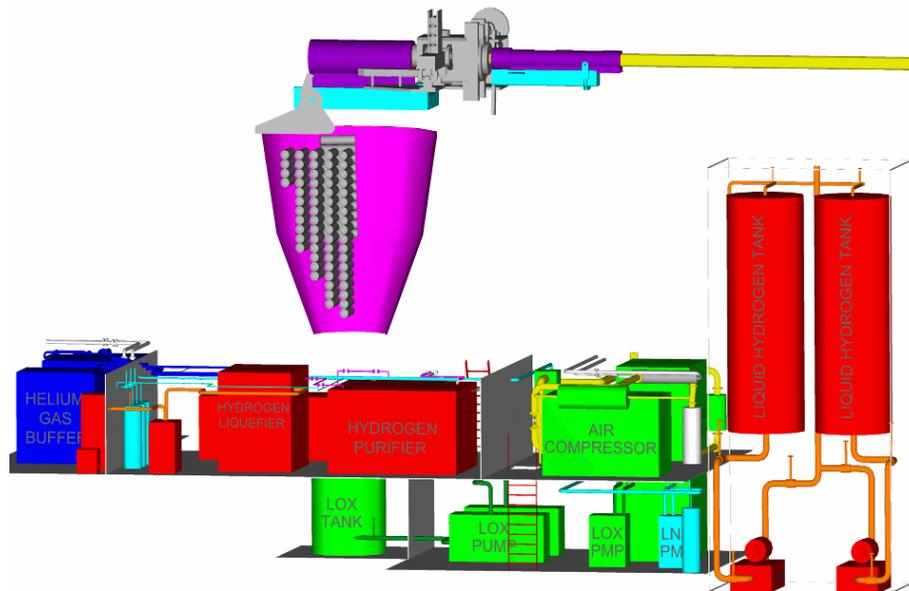
Future Propellant Production – Pilot Plant

Hydrogen Production

- Steam Natural Gas Reforming
- Diesel Reforming
- Electrolysis

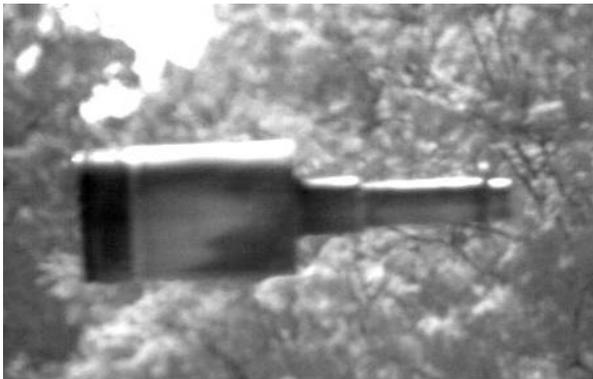
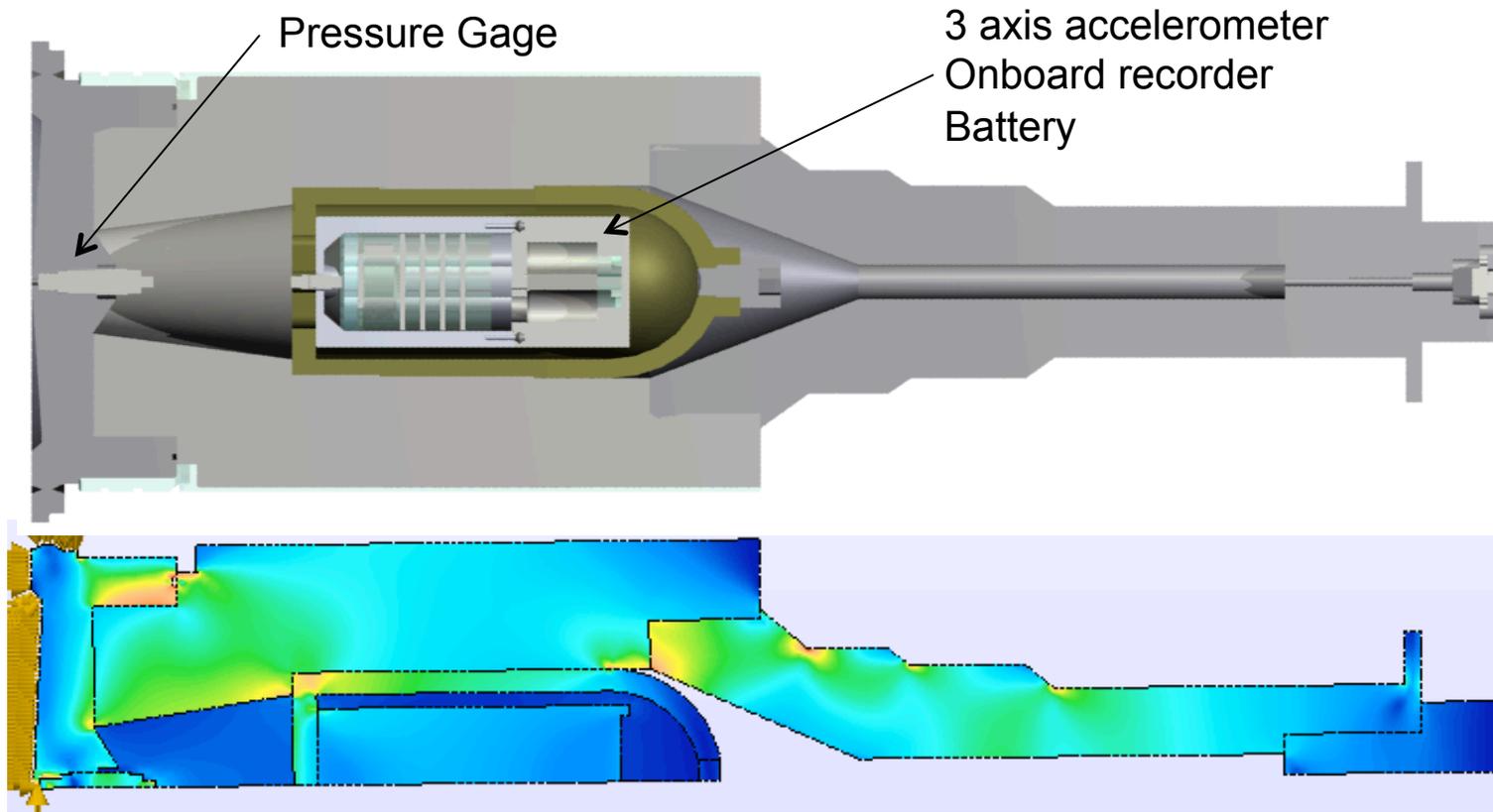
Oxygen Production

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



Possible pilot plant using off the shelf hardware

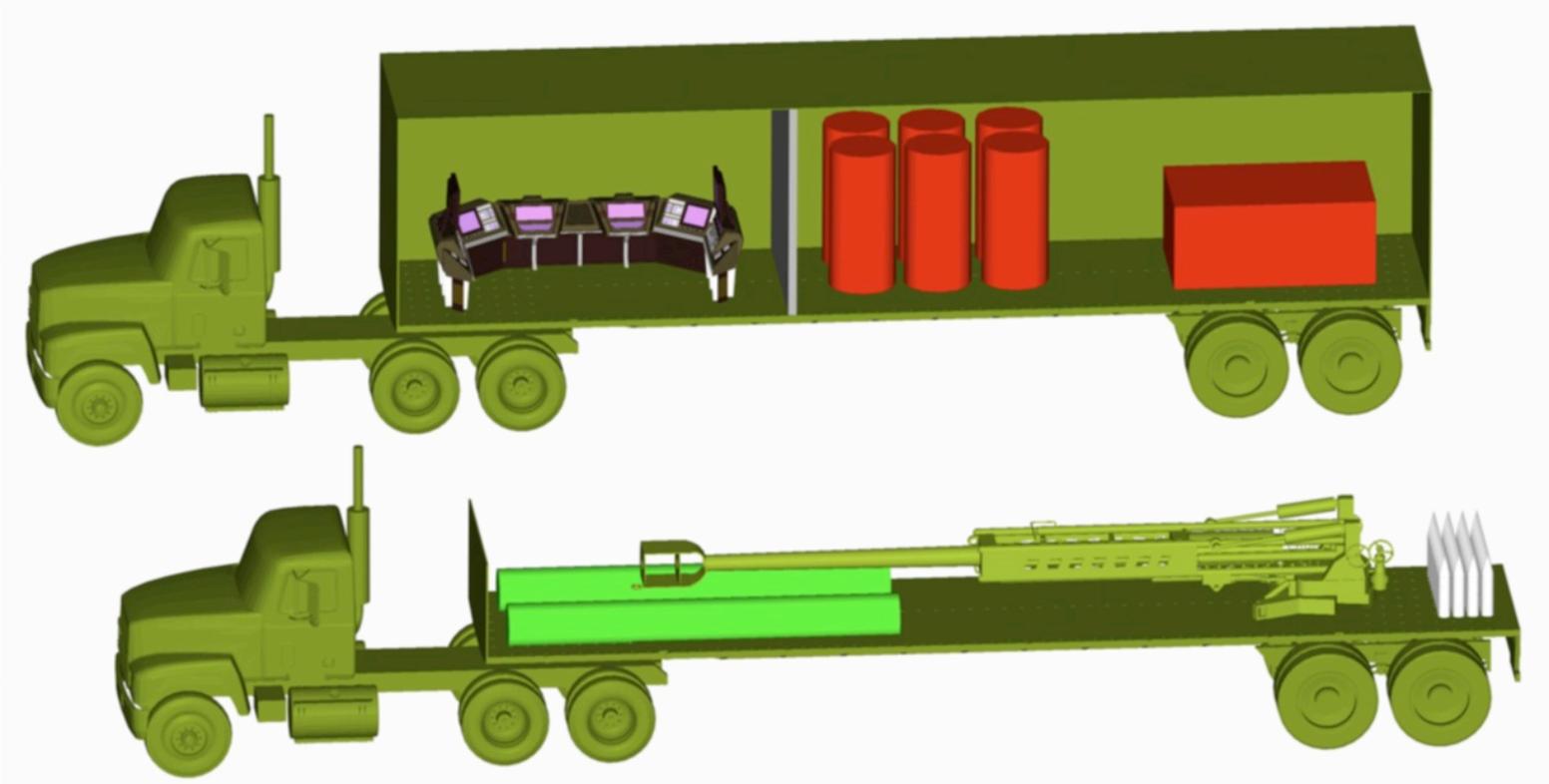
Future – Instrumented Projectiles



Future – Instrumented Projectiles



Future – Transportable Extreme Range System



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



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