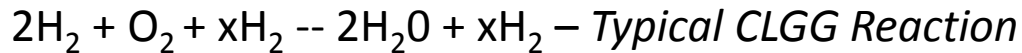




## *Progress Towards a Near Term Extreme Range Canon*

Presented by UTRON Inc.  
May 16, 2012

# Characteristics of a Combustion Light Gas Gun - Chemistry



In the CLGG;

Oxygen quantity controls the available energy

Hydrogen serves both as a propellant and diluent

Hydrogen quantity controls the;

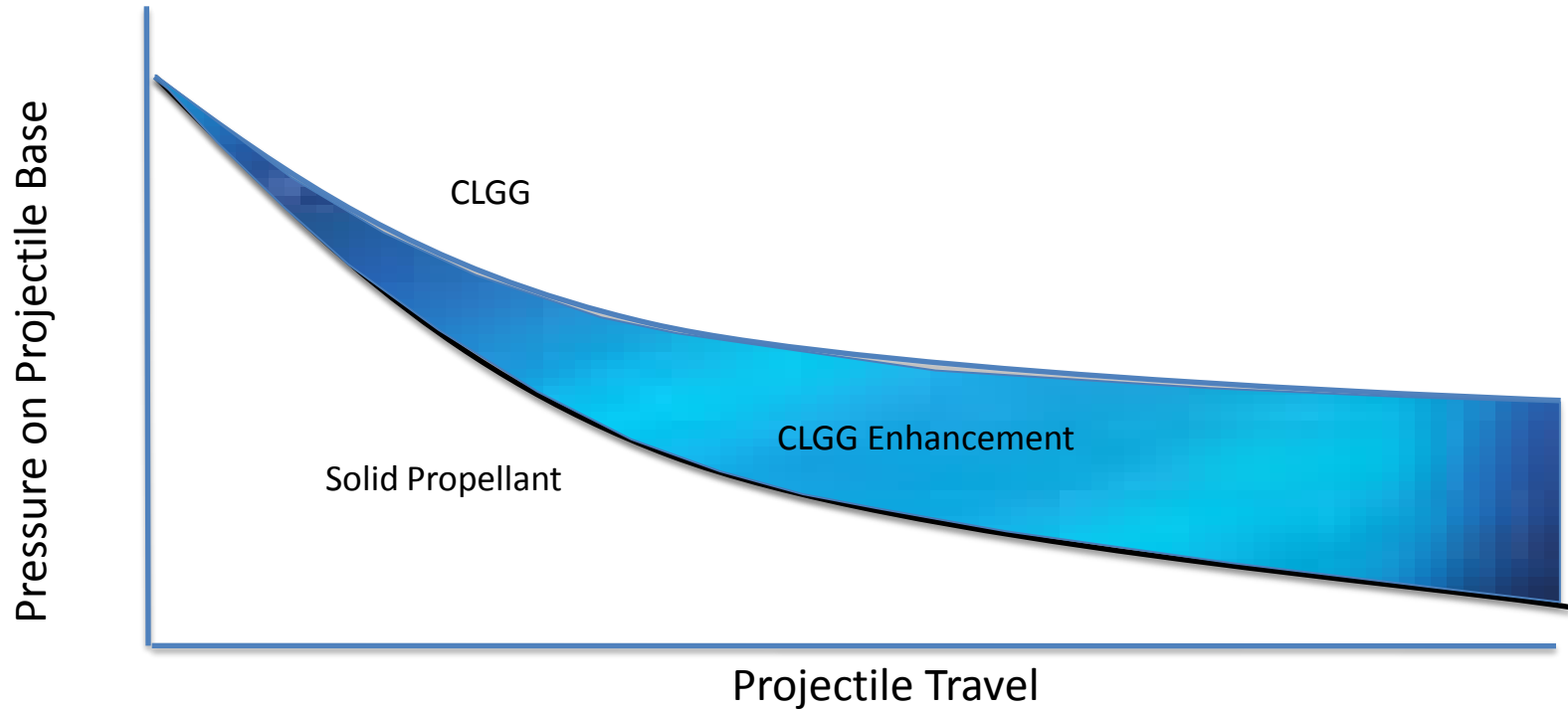
Sound Speed

Combustion Temperature (< 2700 K)

Molecular Mass

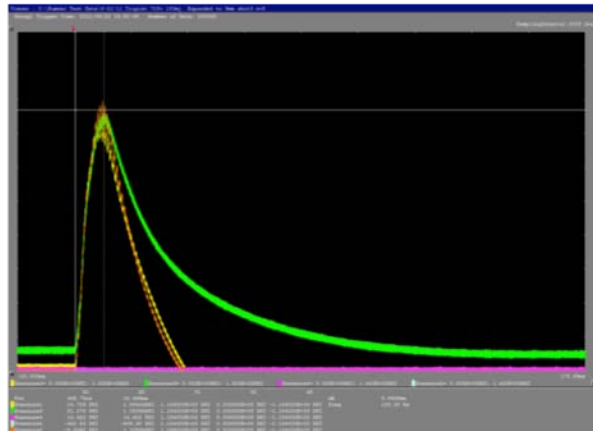
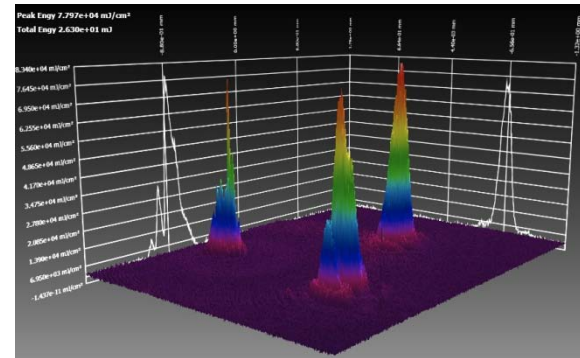
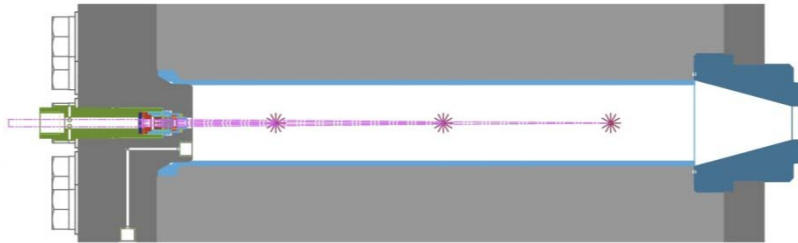
**Single chamber weapon  
(i.e., not a laboratory device)**

## Key CLGG Benefits



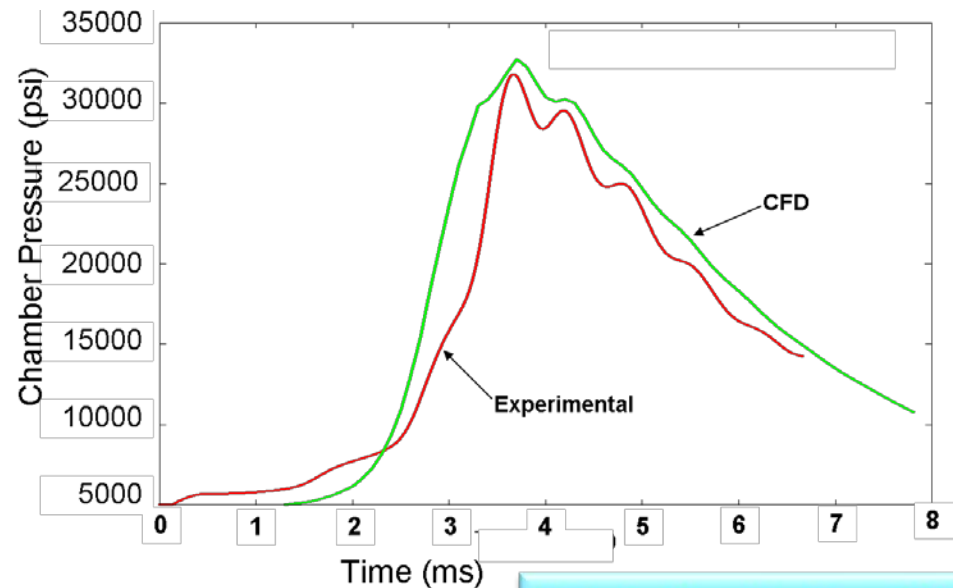
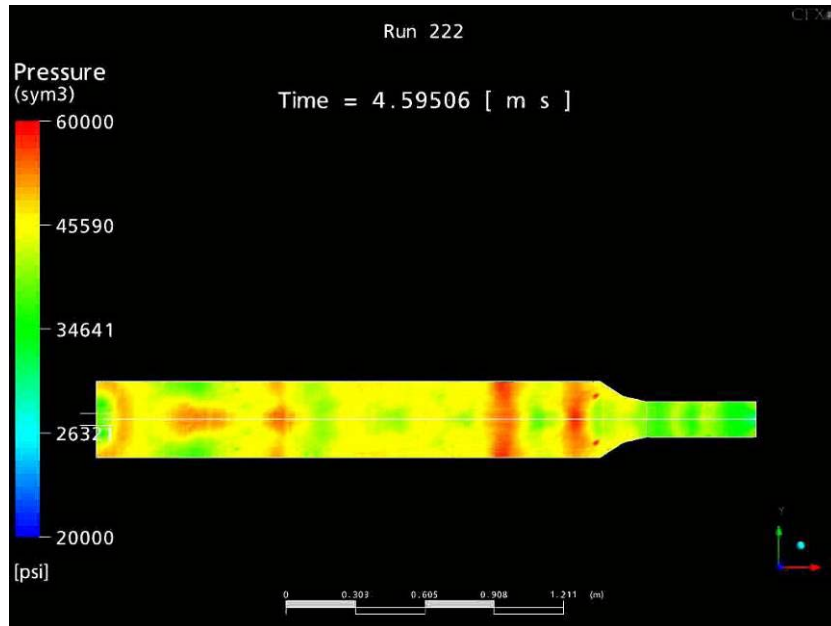
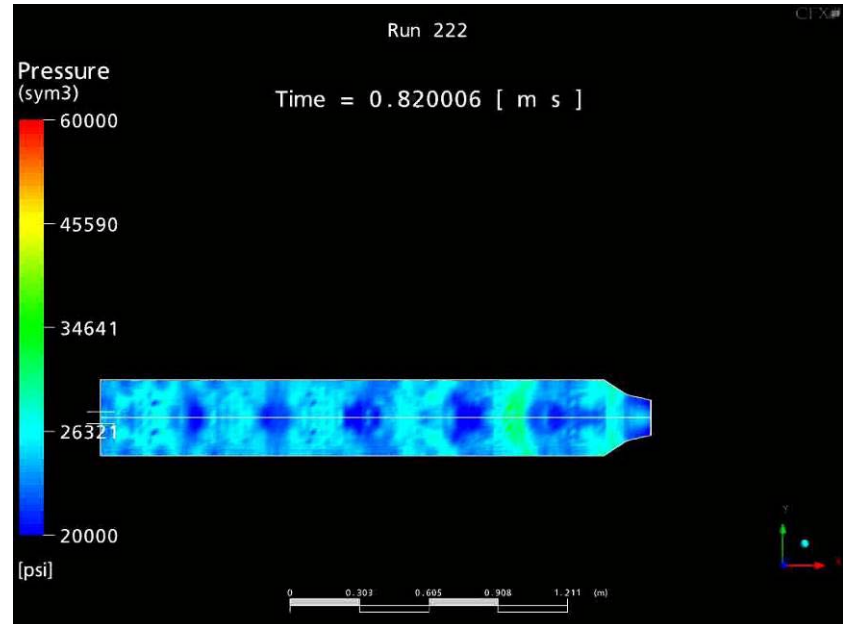
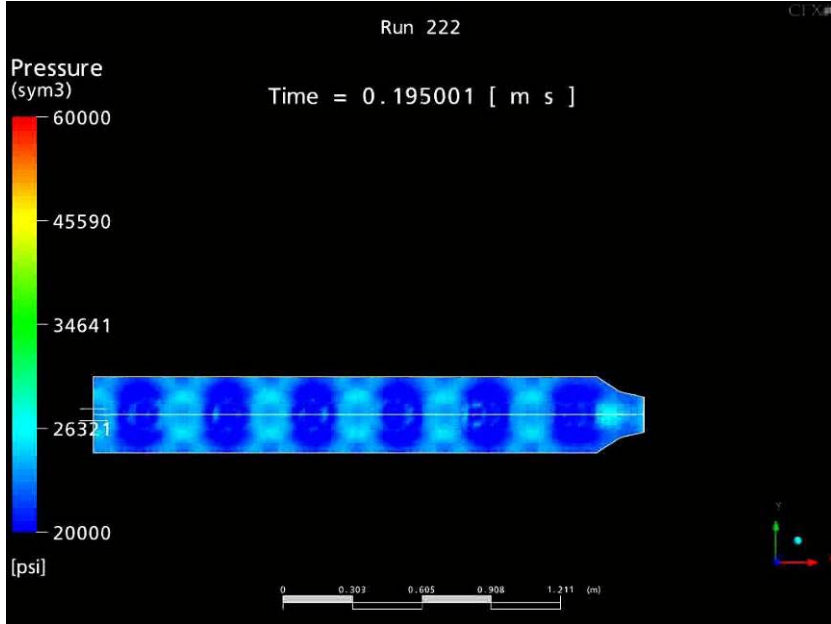
- Higher velocity and/or muzzle energy
- Zoning control
- Lower pressure & acceleration
- Ability to produce propellant onsite

# Characteristics of a Combustion Light Gas Gun – Laser Ignition



Laser provides ignition tailoring

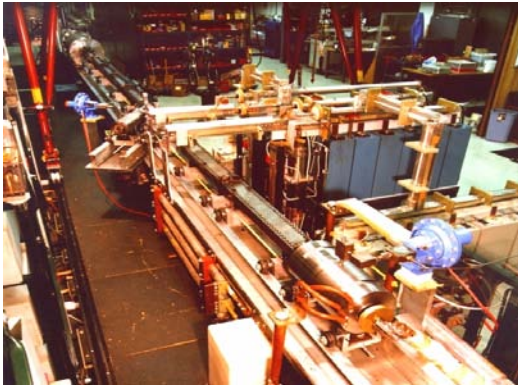
# Characteristics of a Combustion Light Gas Gun – Modeling



Modeling is simplified

# CLGG History, Accomplishments, and Funding

1993, 16mm ELGG - CLGG



1995, 45mm CLGG



2007, 155mm CLGG



## Major Accomplishments

- Scaled from 16 to 45 to 155mm bore size
- Developed Predictive CFD Models
- Performed 6 round a minute firings in 45mm
- Fired 155mm at energies up to 28 MJ to date
- Developed non-intrusive ignition techniques
- Completed design of 155mm mobile platform with resupply vehicle

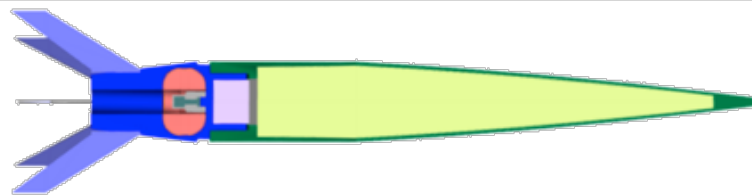
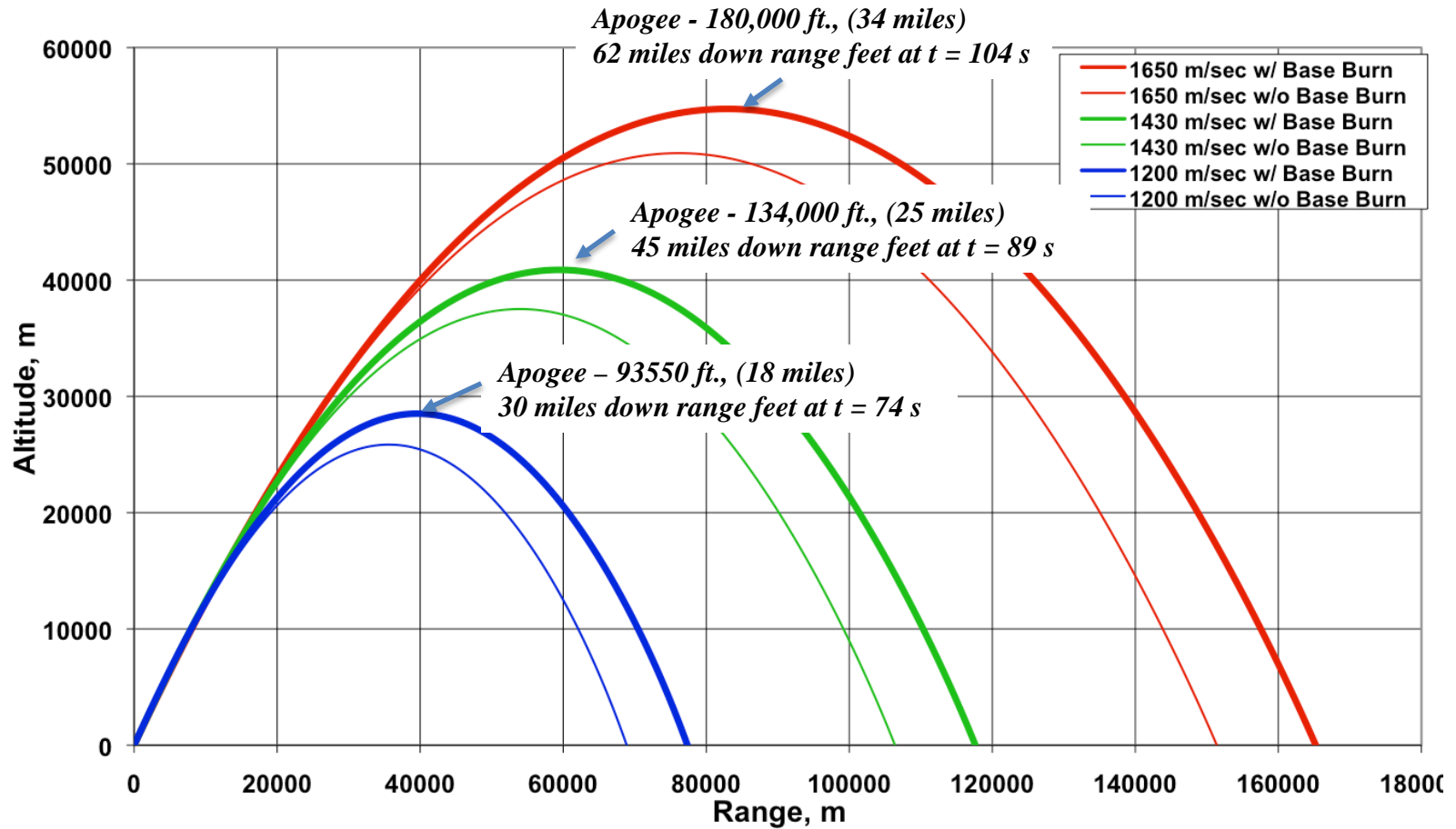
**Nearly 20 years of development**

# 155 mm Demonstrated Performance to Date

Projectile mass (kg)	Peak chamber pressure (psi)	Velocity (m/s)	Kinetic energy (MJ)
20	25,000	1667	28
44	45,000	1084	26



# CLGG – Ballistic Profiles (Max Range)





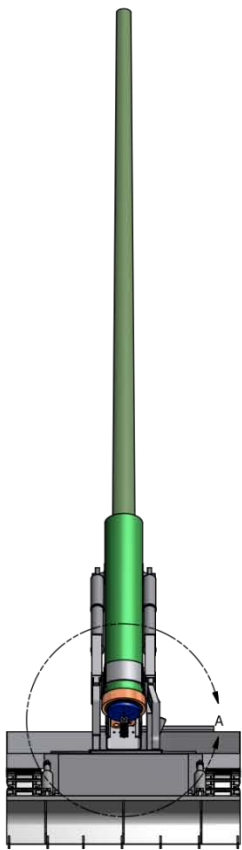


*Engineering and Design of a 155mm Extreme Range  
Demonstrator*

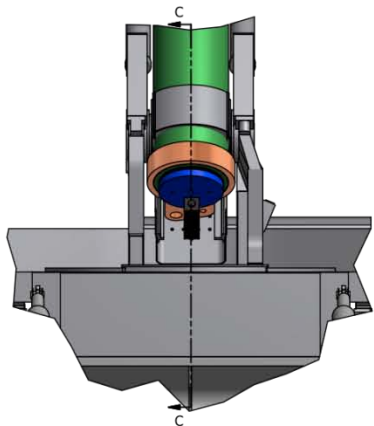
# M110 Based Firing Platform



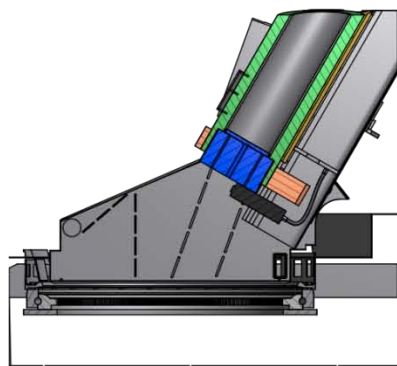
# M110 Based Firing Platform



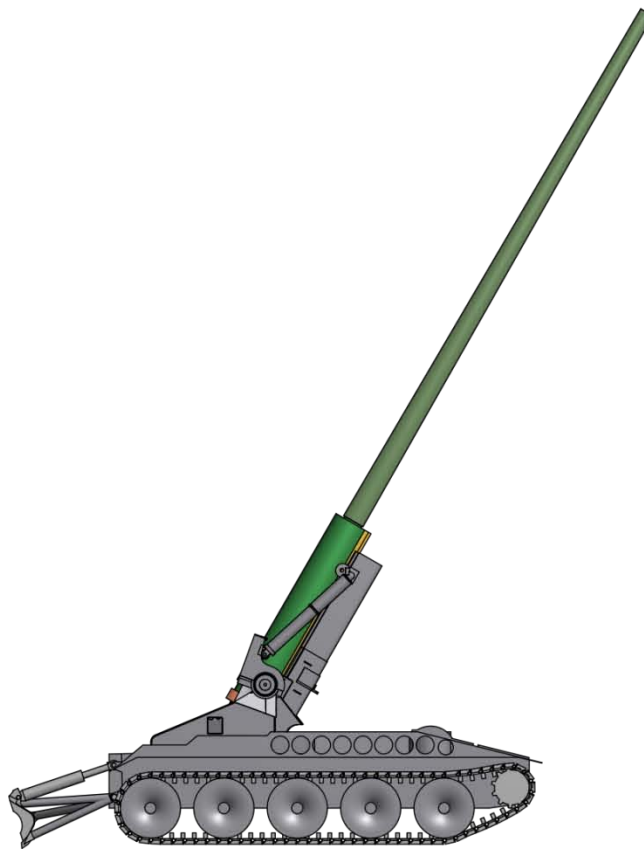
REAR VIEW



DETAIL A  
SCALE 1 / 15



SECTION C-C  
SCALE 1 / 15



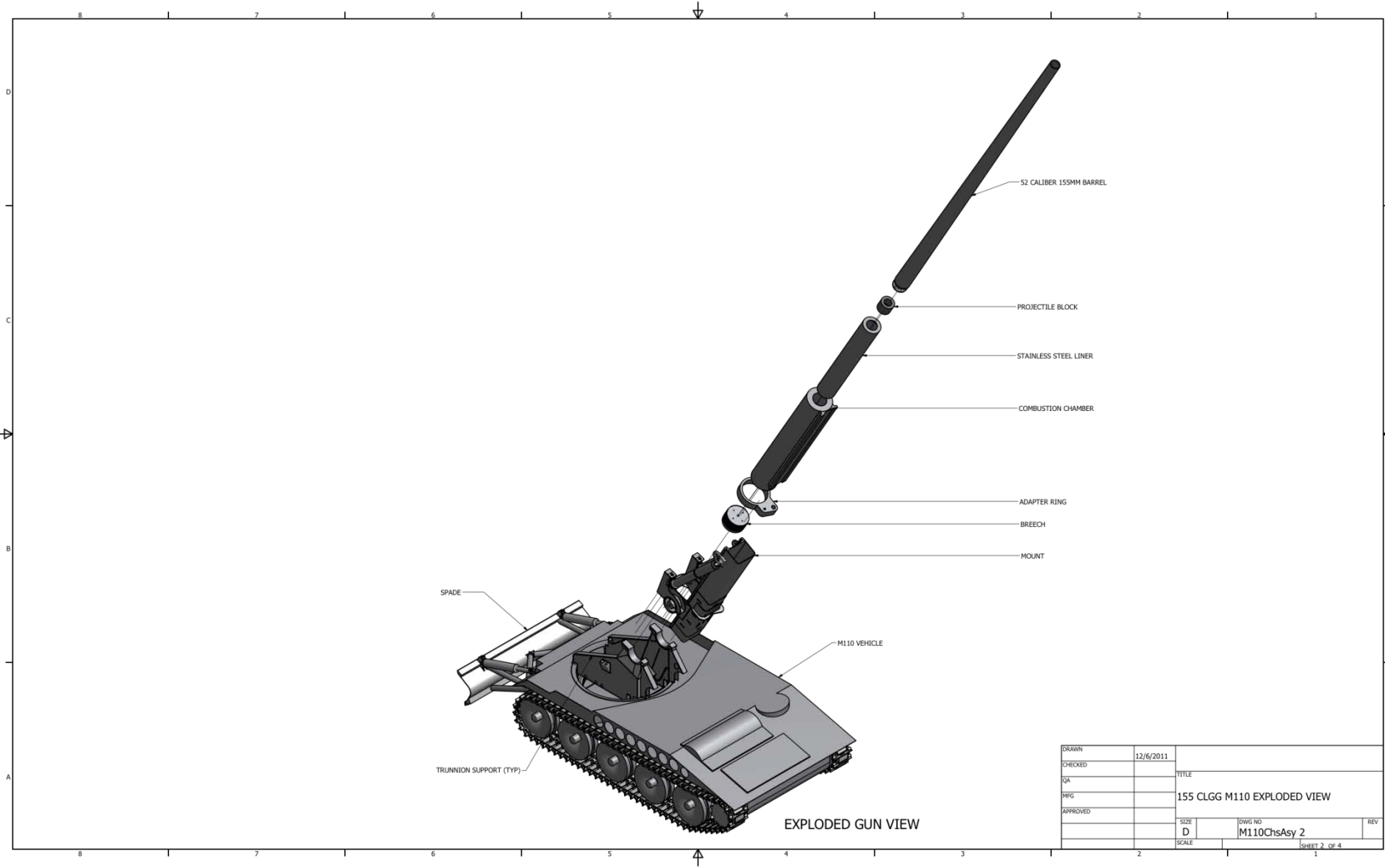
SIDE VIEW



FRONT VIEW

DRAWN	12/6/2011	TITLE	
CHECKED		155 CLGG M110 VIEWS	
QA		SIZE	DWG NO
MFG		D	M110ChsAsy 3
APPROVED		SCALE	REV
			1

# M110 Based Firing Platform



SPADE

TRUNNION SUPPORT (TYP)

M110 VEHICLE

52 CALIBER 155MM BARREL

PROJECTILE BLOCK

STAINLESS STEEL LINER

COMBUSTION CHAMBER

ADAPTER RING

BREECH

MOUNT

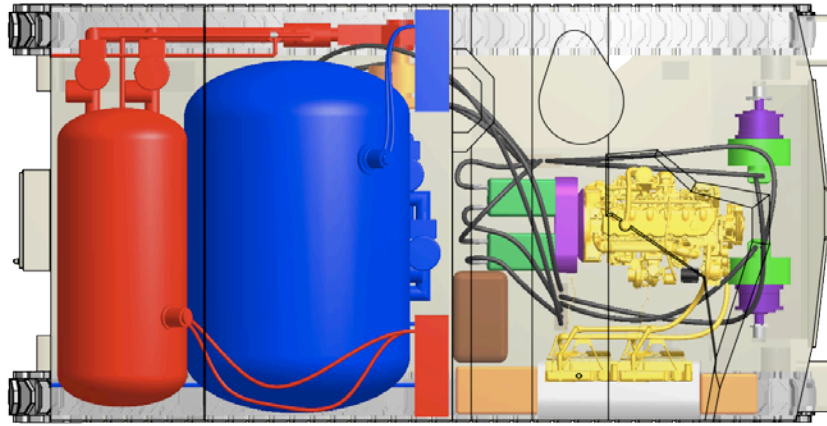
EXPLODED GUN VIEW

DRAWN	12/6/2011		
CHECKED		TITLE	
QA		155 CLGG M110 EXPLODED VIEW	
MFG			
APPROVED		SIZE	DWG NO
		D	M110ChsAsy 2
		SCALE	REV
			1

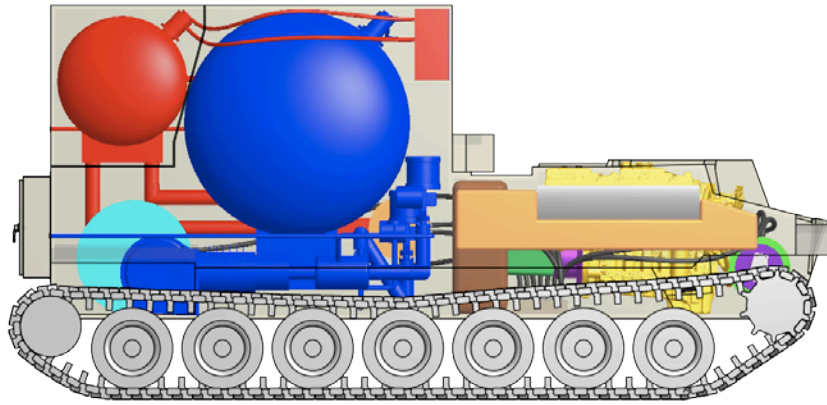
# M992 Based Supply Platform



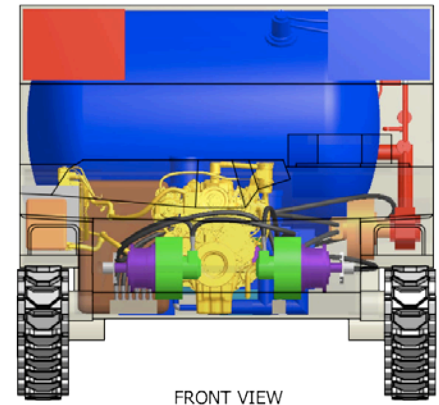
# M992 Based Supply Platform



TOP VIEW



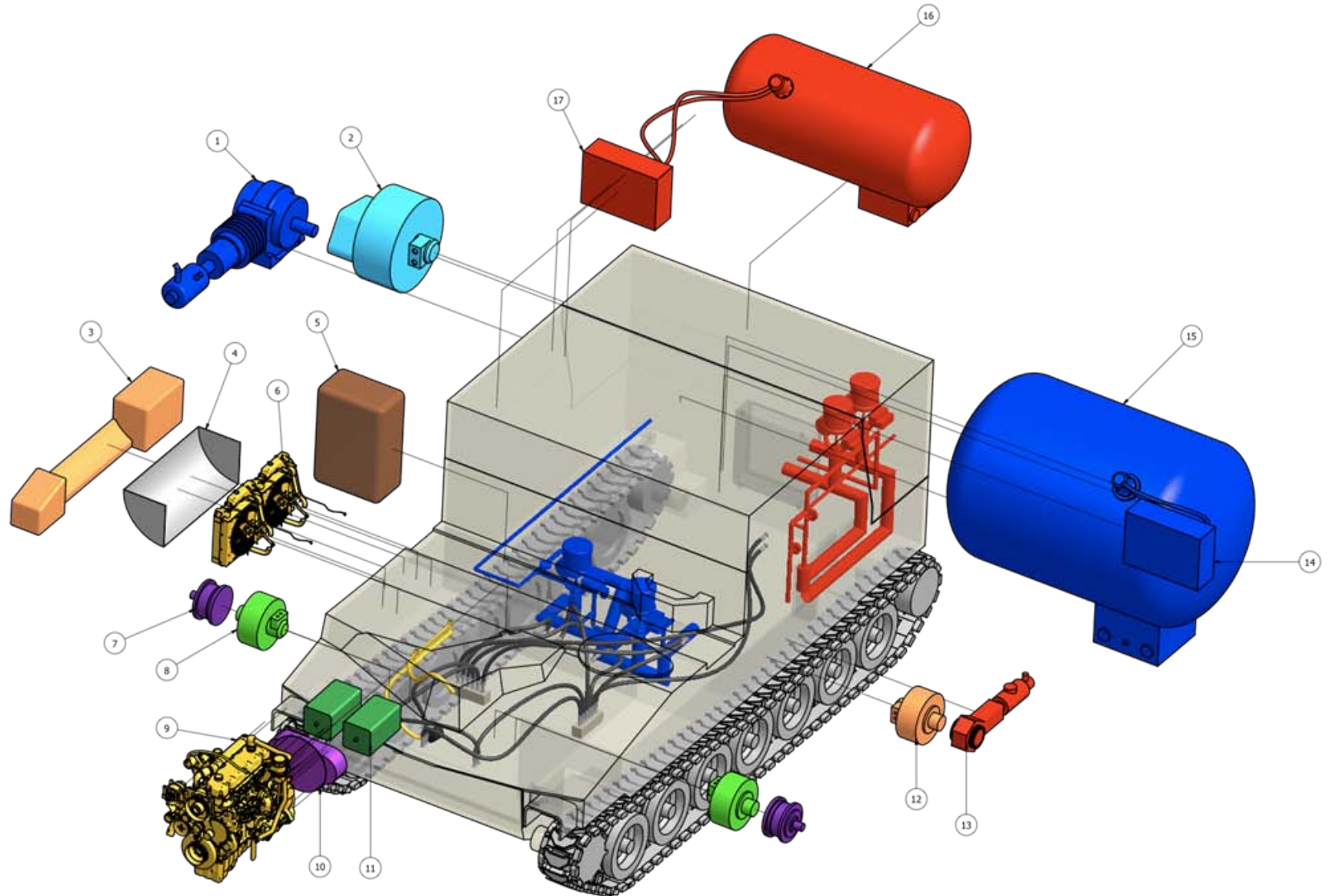
SIDE VIEW



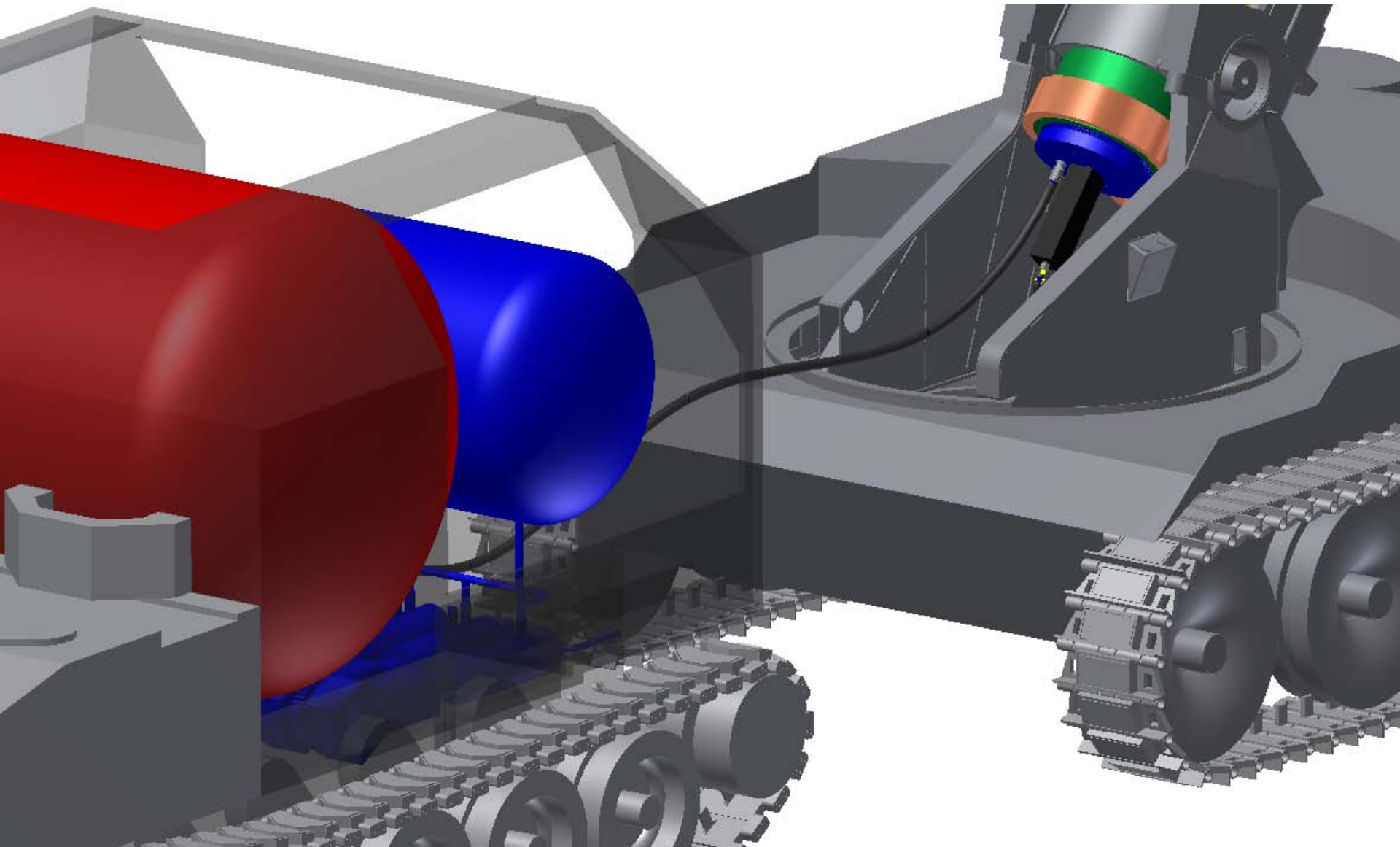
FRONT VIEW

DRAWN	11/29/2011	TITLE	
CHECKED			
DATE		M992 Vehicle Assembly Views	
APPROVED		SIZE	DWG NO
		D	M992 Integrated Vehicle A3
		SCALE	REV
			1

# M992 Based Supply Platform



# CLGG Based 100 km Shooter







# CLGG Based 100 km Shooter

