



Into Reality

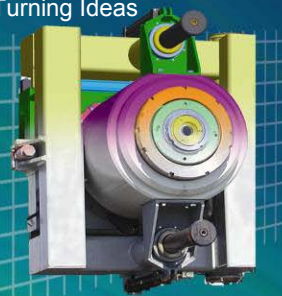
AMGD

ADVANCED MODULAR GUN DEMONSTRATOR

Using Today's Technology for Tomorrow's Weapon Systems

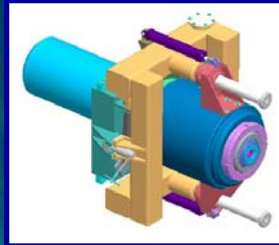
Presented by
Applied Ordnance Technology, Inc.
40th NDIA GARM Conference
New Orleans, LA
April 2005

DISTRIBUTION UNLIMITED



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PROGRAM OVERVIEW

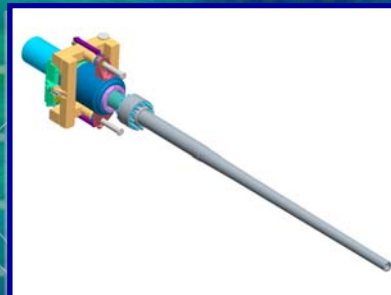


Available Now!

Demonstrated:

- Operating Pressures Up to 100KSI
- 25 shots; 100% Success
- Seal Cartridge Performance
- Chamber / Barrel Connection
- Simultaneous Ignition of Modular Prop Charge
- Chamber Sized for 110-cal. System
- System Can be Upgraded to 200-cal. System

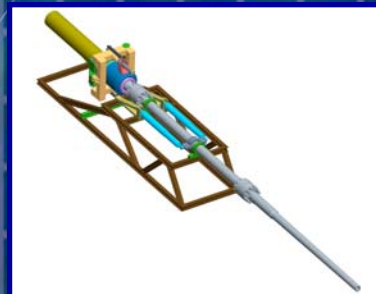
- **Modular**
- **Large Caliber**
- **High Performance**
- **Hypervelocity**



Available FY06.

Upcoming:

- Use Existing Parts
- Test Shots at 100KSI
- Add a Barrel Segment
- Fire Instrumented Projectile



Available FY07.

Near Future:

- Use Existing Parts
- Custom Stand
- Test Shots at 100KSI
- Add Additional Barrel Segment
- Use Larger Volume Chamber
- Launch Instrumented Projectile at High Speeds
- Use Advanced Gun Propellants



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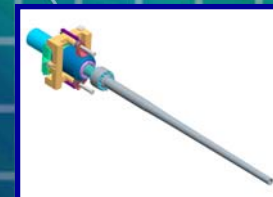
PROGRAM OBJECTIVES

The program objective is to provide the DoD community with a large caliber, high energy, high pressure, high velocity TEST GUN for advancing gun, projectile, propulsion and ammunition technology.

- Hypervelocity Research Platform (Large Caliber)
- Advanced Projectiles
- Advanced Gun Propellants
- Advanced Propulsion & Ignition Systems
- Wear & Erosion Mitigation
- Gun Instrumentation & Safety Systems
- Barrel Coatings/Liners
- Lightweight Barrel Materials

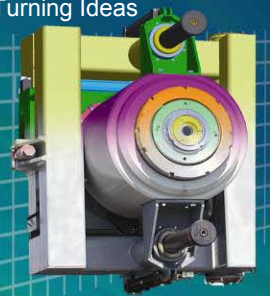


**DST Fixture
Available for Use!**



**BJT Fixture
Available Oct 2005**

OUTLINE

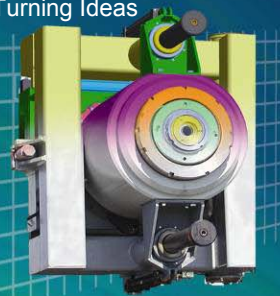


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AMGD Test Fixture

- **GUN DESIGN**
- **TEST DETAILS**
- **PROPELLING CHARGE**
- **INSTRUMENTED PROJECTILE**
- **AMGD PROGRAM PLAN**
- **PROGRAM OBJECTIVE**



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GUN DESIGN

AOT designed a large-caliber high energy, high-pressure, large-volume, chemical gun system.

- **High Energy, High Velocity, High Pressure**
- **Separable Chamber**
- **Multiple, Large Volume Chambers**
- **Disposable Seal Cartridge**
- **Segmented, Smoothbore Barrel**
- **Patent 6,571,676**

Test Fixture

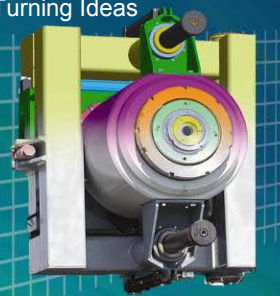


Separable Chamber



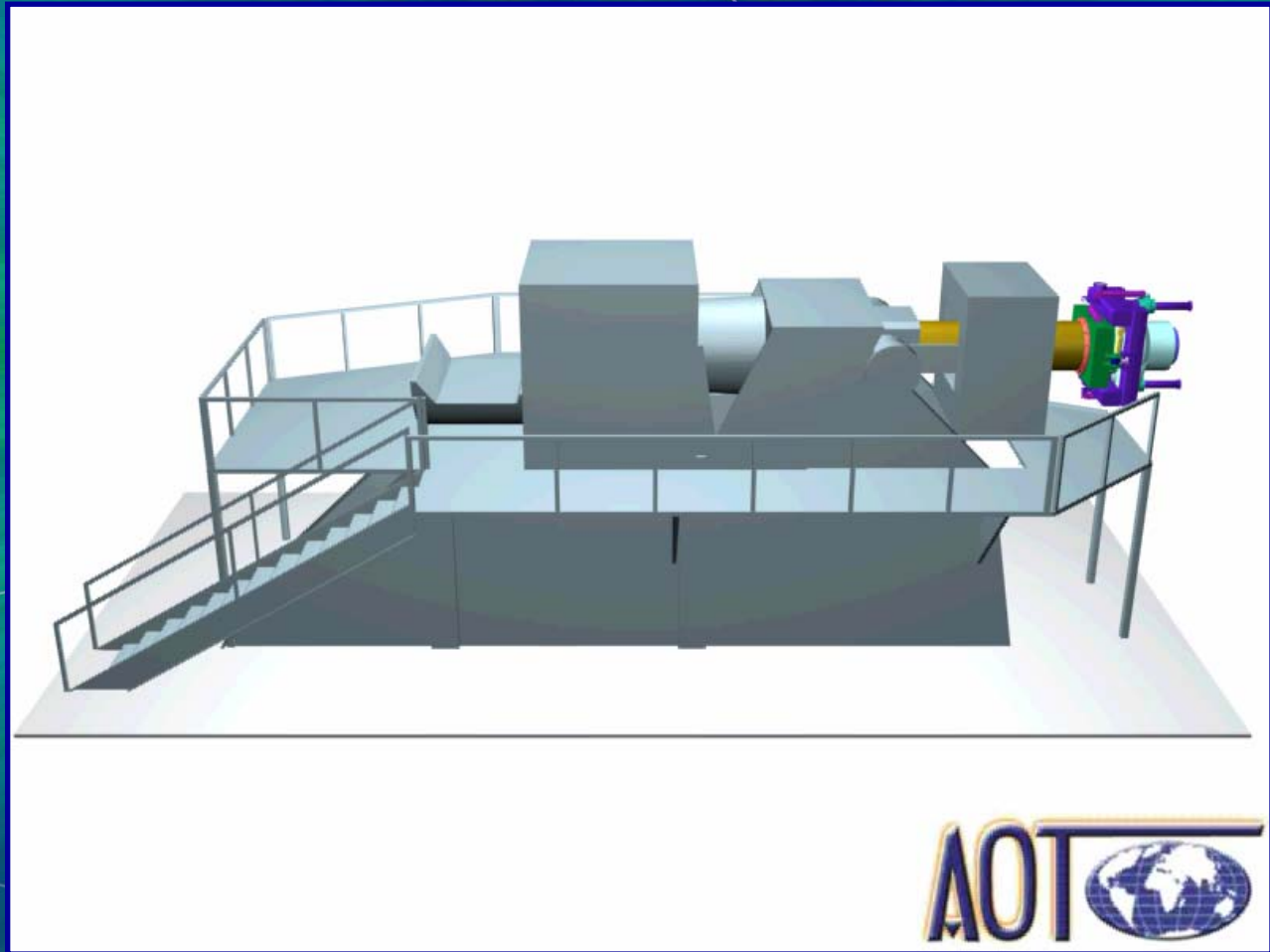
Seal Cartridge

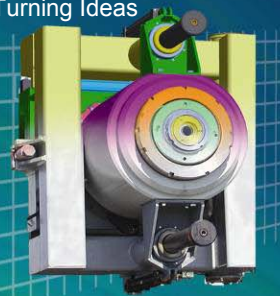




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DST SIMULATION





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DST Fixture

Objectives:

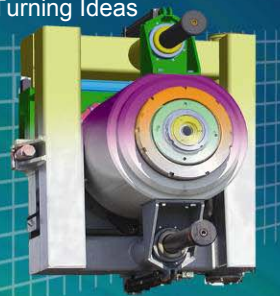
- Seal Cartridge Performance
- Chamber Pressures Up to 100 KSI
- Chamber / Barrel Connection
- Simultaneous Ignition of Modular Prop Charge

Fixture Features:

- Full-scale 5-in. Gun Parts
- Nozzle/Throttle to Simulate P-t Curve
- Automated Chamber / Barrel Connection

Sequence of Pictures Showing Fixture Opening





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DST RESULTS

- **Test Performed at NSWC-DD**
- **Conducted 25 Shots**
- **Pressures Ranging from 40-100KSI**
- **Seal Cartridge Performance Exceptional**
- **Successfully Demonstrated Chamber/Barrel Coupling**
- **Modular Prop Charge Performance Repeatable**

Chamber w/ Seal

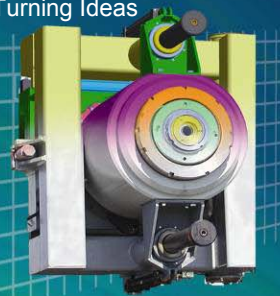


Coupler



Fired Seal Cartridge



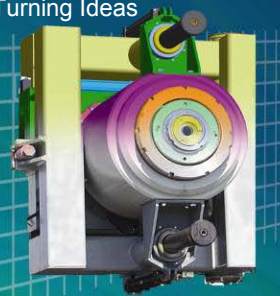


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SETBACK TEST FIRING

**AMGD - Dynamic
Setback Test
15-18 April 2005**

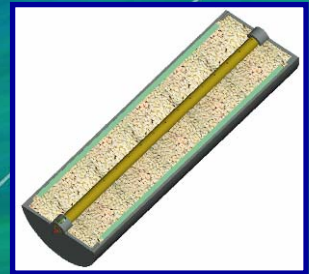
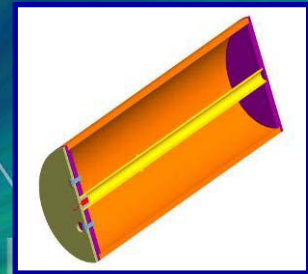


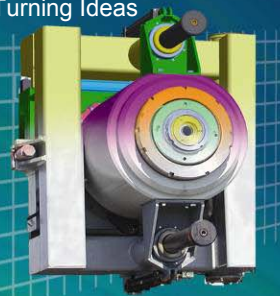


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PROPELLING CHARGE

- **Modular Prop Charge**
- **Simultaneous Module Ignition**
- **Consumable Case**

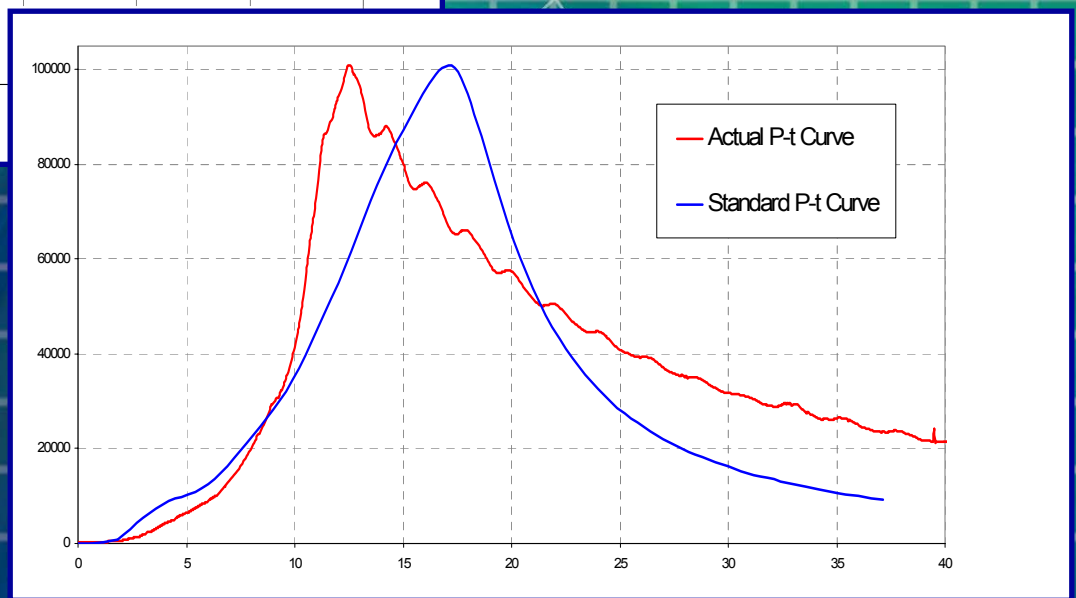
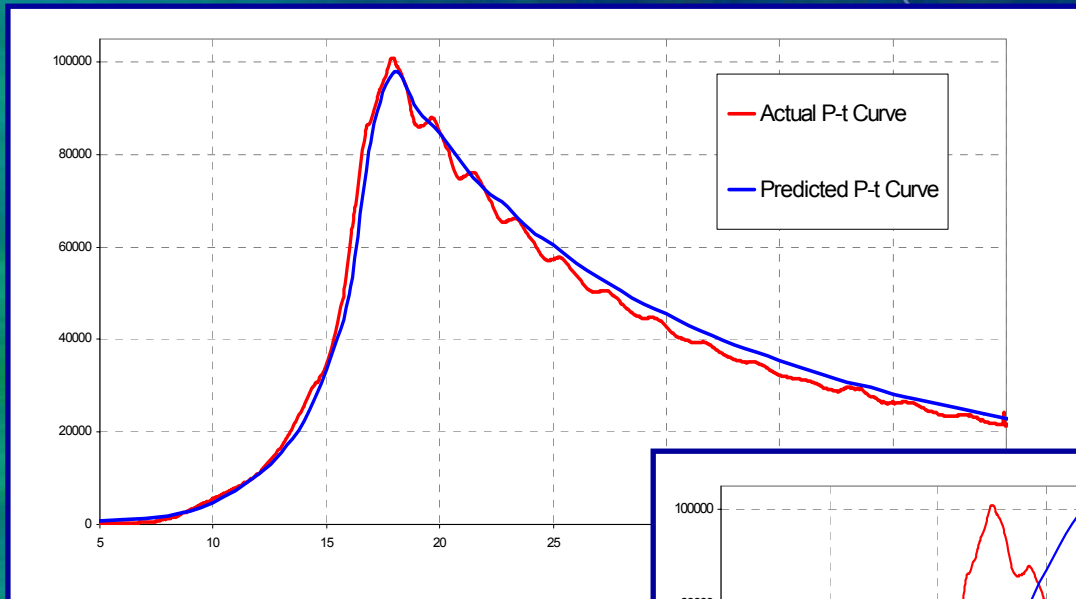




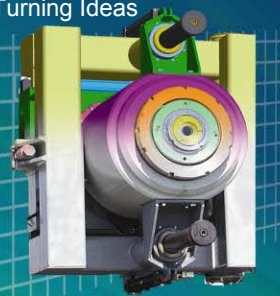
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PROPELLING CHARGE

DST Test Results – April 2005 Prop Charge Performance

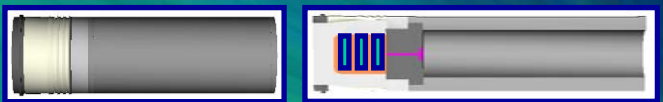


**DST P-t Curve
vs.
Standard P-t Curve**



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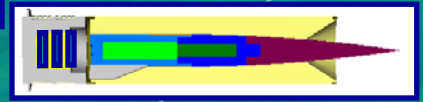
INSTRUMENTED PROJECTILE



Instrumented Pusher Assembly (IPA)



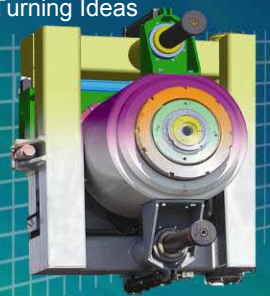
Instrumented Monolithic Pusher Test Projectile (IMPTP)



Instrumented Long Range Test Projectile (ILRTP)



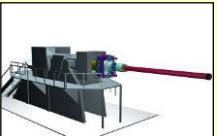





- **Capture Interior and Exterior Ballistics Data**
- **Leverage Army Instrumentation Expertise**
- **Utilize Existing, Gun-proven Sensors and TM Solutions**
- **Embed Instrumentation in Modular Fashion**
- **Conduct Hypervelocity Research for Large Caliber Projectiles**

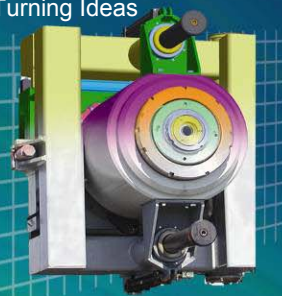
State-of-the-Art + Timely + Robust + Low Cost = Low Program Risk!



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AMGD PROGRAM PLAN

Test Name	Test Gun Configuration	Projectile	Propellant	Status
Proof-of-Concept	Army Test Asset 	None	M30A1	Completed
Setback Test	5-in., 50L chamber 	None	NACO	Completed
Barrel Joint Test	5-in./70-cal., 50L chamber 	IPA 	Advanced Gun Propellants	FY06 Q1
Propellant Characterization Test	5-in./110-cal., 50L or 100L chamber 	IMPTP 	Advanced Gun Propellants	FY06 Q4
155mm Long Range Testing	155mm/200-cal. 	ILRTP 	Advanced Gun Propellants	FY09 Q2



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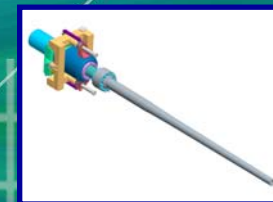
AMGD USES

Test Platform To:

- **Validate Modeling & Simulation**
- **Develop Hypervelocity Projectile**
- **Conduct High Velocity Penetration Effects**
- **Advance Gun Propellants**
- **Evaluate Instrumentation High-G Survivability**
- **Evaluate Precision Guided Munitions**
- **Study Barrel Life**
- **Test Wear & Erosion Mitigation**
- **Advance Gun Barrel Technology**



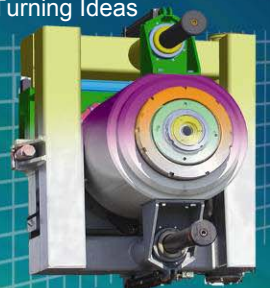
**DST Fixture
Available for Use!**



**BJT Fixture
October 2005!**



**XLR Fixture
July 2006!**



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POINTS OF CONTACT

Applied Ordnance Technology, Inc.
103 Paul Mellon Court, Suite A
Waldorf, MD 20602

301.843.4045

www.aot.com

Steve Coladonato, scoladonato@aot.com

At the Conference:

Mark Adams, AOT

Heather Huber, AOT

Scott Huber, AOT

George Wilson, AOT

Steve Coladonato, AOT

Steve Adams, AOT

Jason Budd, NSWC-IHD

Shane Sisemore, NSWC-DD

R.D. Cooper, NSWC-DD

