Bushmaster 12.7mm Automatic Weapon

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Why a 50 cal Bushmaster?

Customer/Turret Integrator Request

System Benefits
(Advantages over Legacy Systems)

- Higher Reliability & Lower Life Cycle Costs than Legacy Systems
- Shorter Receiver For Minimized Turret Intrusion (420mm) and Swept Volume
- Designed for SLAP Round & Ammo Growth
- Dual Ammunition Feed
- Increased Belt Pull and Reliability for Remote Applications
- Low Vehicle Toxicity

New Design Tools

Paradigm Shift

•The 50 cal Team Adopted the St. Louis Design, Manufacturing and Producibility Simulation (DMAPS) group's Best Lean Practices for the 50 cal Bushmaster Design Effort.

•The Team also Adopted iMAN as the Product Data Manager (PDM) for the 50 cal Bushmaster Effort

Best Lean Practices

•Model Based Definition (MBD)

– 3D Parametric Solid Models
– All GD&T and Tight Tolerance Dimensions attached to Model in 3D space
– No Drawing Generated
– Vendors received 100% Computer Metadata for Part Definition

•Used Inter Part Expressions and a Design Data File (DDF) to Control the Relationship (location) of Key Components

– Whole Gun Assembly is Morphable by Changing Expression Values in an Excel file and Streaming them into the DDF

Product Design Manager (PDM)
iMAN

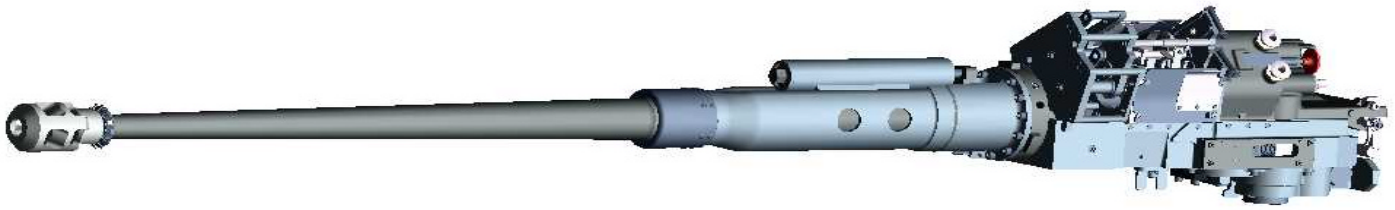
•Enhanced Top-Down Design in Unigraphics II

•Improved the Product Development Process by Organizing, Managing and Communicating Information Throughout the Product Life Cycle.

•Enabled the 50 cal Team to Transition into Web Centric Data Delivery Process with Customers and Vendors

•Streamlined the Release Process via Electronic Sign-off and Email Notification

Technical Specifications



Hangfire Protection:	Mechanical Hangfire System		
Ammo Compatability:	Electrical: Power Supply 24Volts DC Peak Inrush 260Amps (max) All NATO qualified 12.7mm Natures BFI systems with output (typical) SS, 5,10, 20, All (Selected On Control Panel)		
Rate of Fire:	400rnds/min		
Burst Limit:	Steady State 40Amps (max) Steady State 25Amps (typical)		
Unit Weights Counter:	Dual Belt Feed Mechanical Electronic Rnd Counter		
Feed System:	Mechanical	2.2Kgs	27lbs
Feed Selection: (optional)	Manual on Gun (Upgradeable to Solenoid)		
Receiver		16.0Kgs	35lbs
Parts Life:	Feeder & Barrel stressed for 100,000 rnds with SABOT Ammo	6.8Kgs	15.0lbs
Weapon		**34.4Kgs**	**75.8lbs**
Dimensions:	Length	1597mm	61.5inches
	Width	265mm	10.4inches
	Height	300mm	11.8inches
	Intrusion	**420mm**	**16.3inches**

Applications

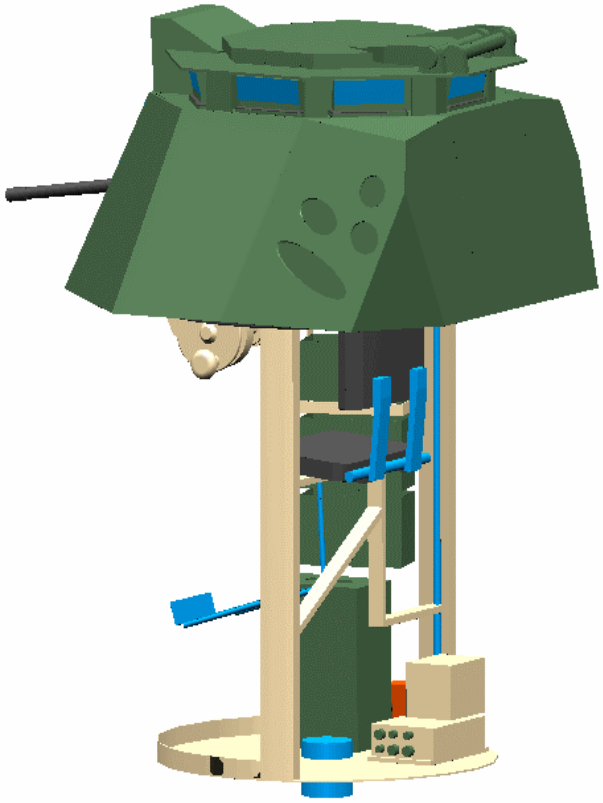
- One Man Turrets
- Overhead Weapons Systems (OWS)
- Armored Fighting Vehicle Coax Gun

Armored Fighting Vehicle Coax Gun

Overhead Weapons Systems (OWS)

- MRAV
- SWARM
- Lightning

One Man Turrets



Program Status

- **Design Status**

  Design Effort Included the Following Designs:

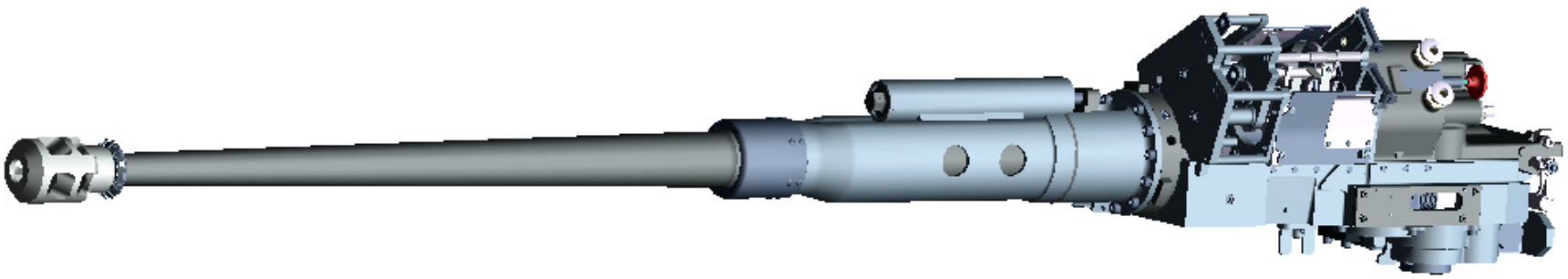
  - Gun Assembly
    - Receiver Assembly
    - Barrel Assembly
    - Feeder Assembly
  - Link
  - Feed Chutes

- **Hardware Status**

- **Testing Status**

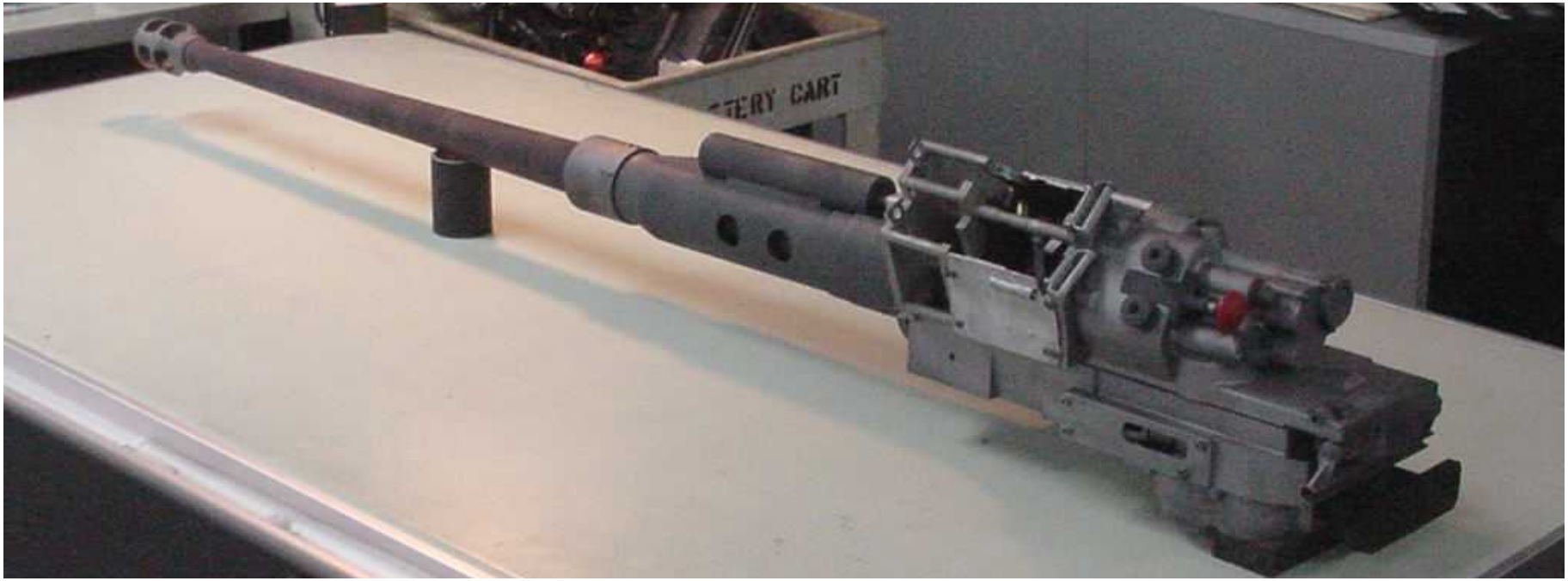
Design Status

•Solid Models (Design) Completed



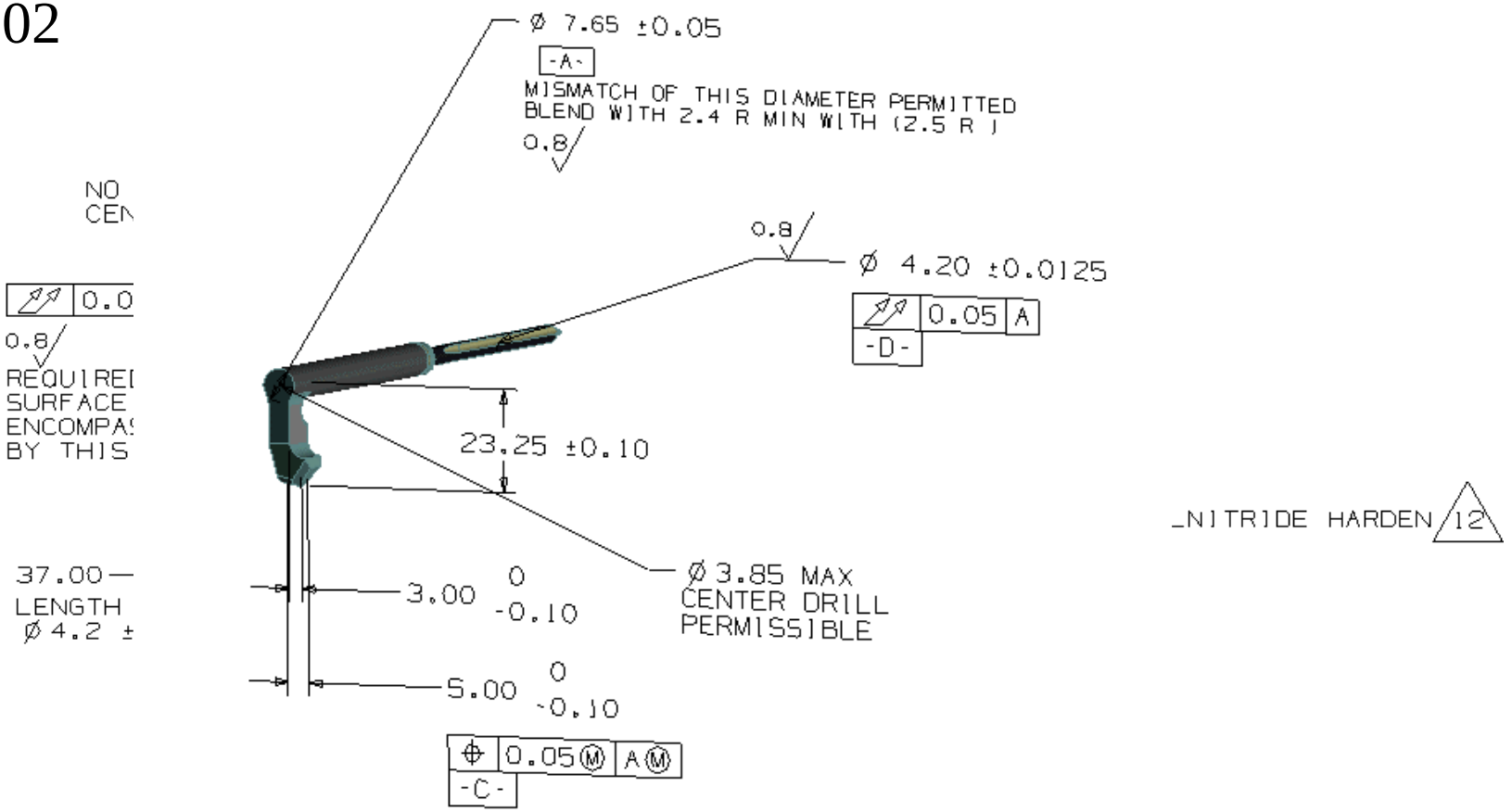
Design Status (cont.)

- 3 Stereo Lithography Models (For Integration Studies) were Completed Aug 2001



Design Status (cont.)

- All MBD Models Completed and Sent out to Machine Shops/Vendors Feb 2002

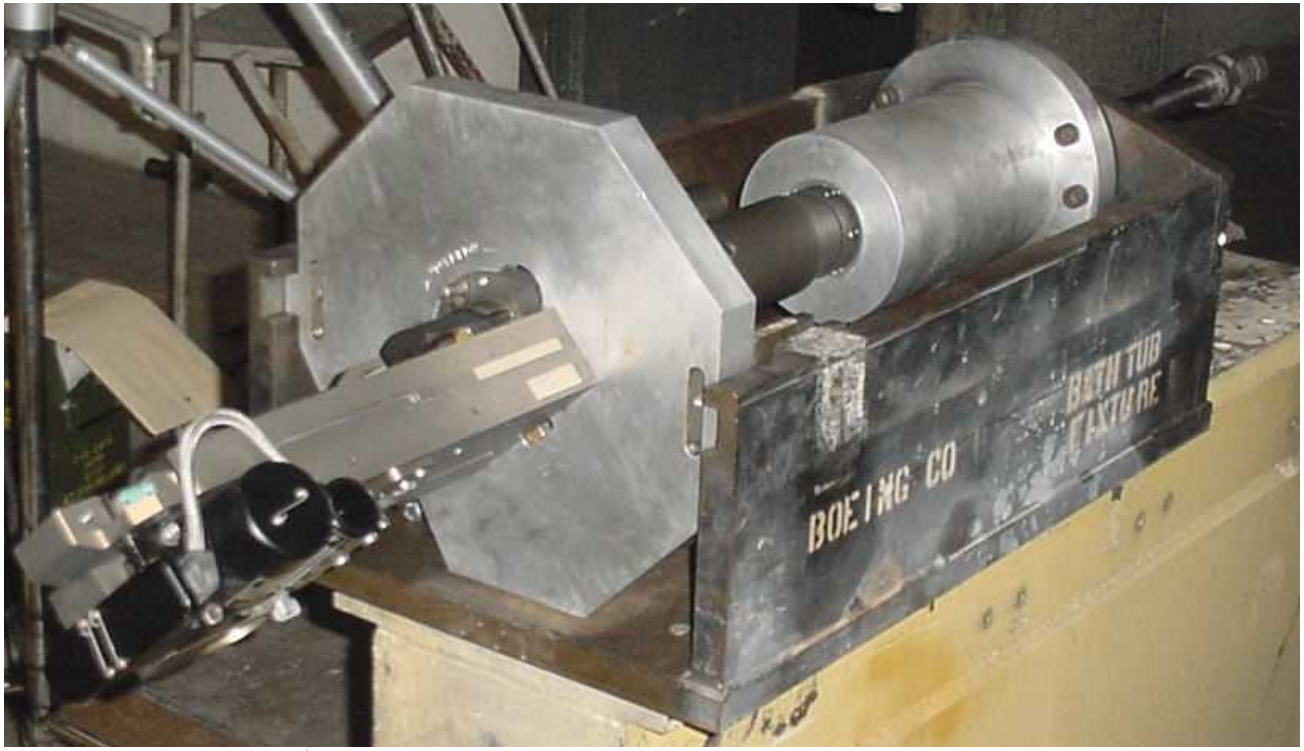


Program Status: Hardware Status

- Receiver Parts 100% Delivered and Assembled
- Barrel Parts 100% Delivered and Assembled
- Links Delivered
- Feeder Parts 60% Delivered with Remaining Parts Scheduled by May 2002

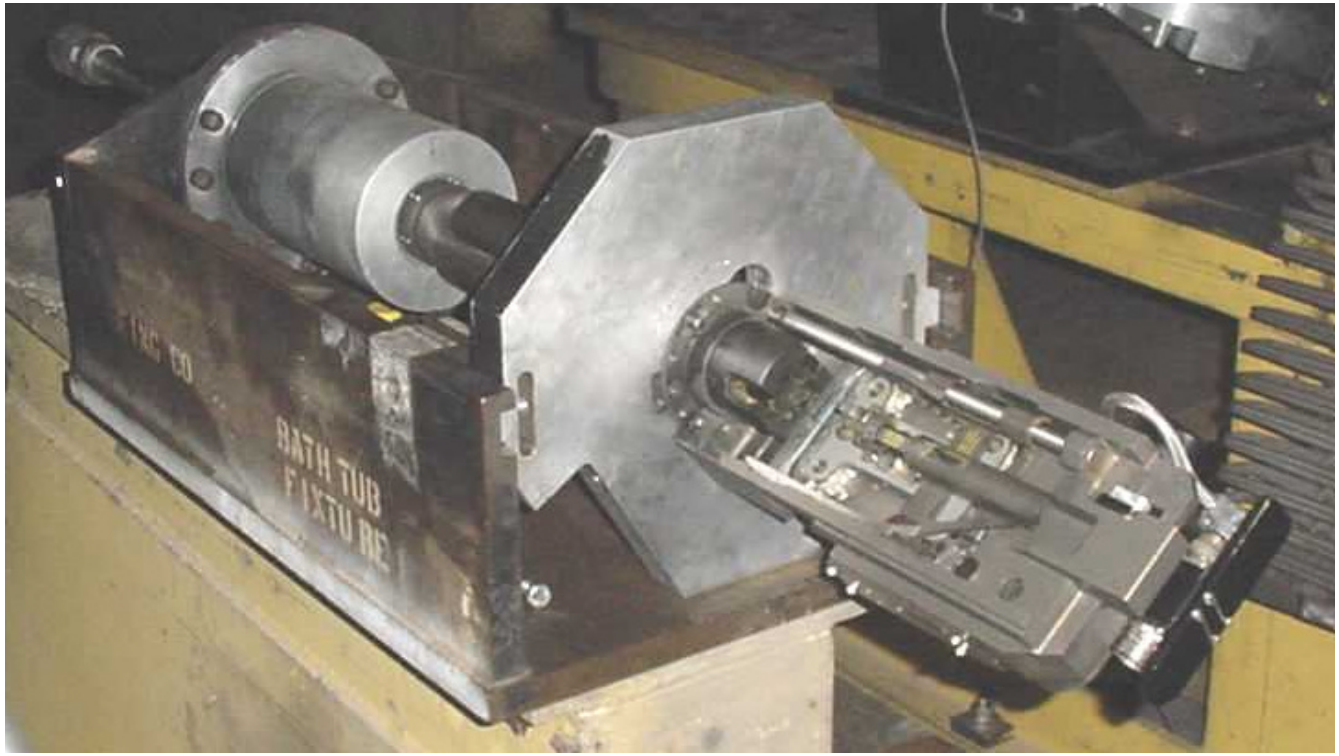
Program Status: Testing

- Receiver Manually & Electrically Fired
  - Peak Recoil Force Measured at 1,500 lbs
  - Mechanical Hang Fire System Validated



Program Status: Testing (cont.)

- Receiver Electrically Cycled at Rates Greater Than 500 spm with High Speed Video & Instrumentation to Validate Proper Function



- Feeder Assembly & Burst Firing Scheduled for June 2002

Summary/Conclusions

- Gun is Expected to have Bushmaster Parts Life & Reliability
- Shorter Receiver for Minimized Turret Intrusion (420 Achieved) & Swept Volume
- Designed for 100K Bolt & Breech Life with SLAP Ammo
- Links & Feed Sprocket Tested to Greater than 75 lbs Belt Pull with no Failures
- Low Vehicle Toxicity
- We are Responding to Turret Manufactures/Integrator's Request