Bushmaster 12.7mm Automatic Weapon

NDIA Guns & Ammo
Panama City FL
15-18 April 2002

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Outline/Contents

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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

WHY 50 BUSHMASTER DESIGN TOOLS TECHNICAL DESCRIPTION APPLICATIONS PROGRAM STATUS
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

Rate of Fire: 400 rnds/min
Burst Limit: SS, 5, 10, 20, All (Selected On Control Panel)
Feed System: Dual Belt Feed
Feed Selection: Manual on Gun (Upgradeable to Solenoid)
Hangfire Protection: Mechanical Hangfire System
Electrical: Power Supply 24 Volts DC
Peak Inrush: 260 Amps (max), 165 Amps (typical)
Steady State: 40 Amps (max), 25 Amps (typical)
Rounds Counter: Mechanical or Electronic Rnd Counter (optional)
Parts Life: Breech & Bolt Stressed For 100,000 rnds with SLAP Ammo

Weight:
- Barrel: 12.2 Kgs (27 lbs)
- Receiver: 16.0 Kgs (35 lbs)
- Feeder: 6.3 Kgs (13.8 lbs)
- Weapon: 34.4 Kgs (75.8 lbs)

Dimensions:
- Length: 1597mm (61.5 inches)
- Width: 265mm (10.4 inches)
- Height: 300mm (11.8 inches)
- Intrusion: 420mm (16.3 inches)
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 Manufacturers/Integrator’s Request