Development of a LW30mm M230 Percussion Prime Chain Gun®

Jeremy Vandenbark
Project Engineer
ATK Armament Systems
480-324-8784
Jeremy.Vandenbark@ATK.com

Approved for Public Release, 22 CFR 125.4(b)(13) Applicable
Development History

- The standard LW30mm M230 Chain Gun® has been widely used with AH-64 Apaches and MH-60DAP Blackhawks since the early 1980’s

- The M230 Percussion Prime (PP) variant was developed in the late 1980’s by Hughes/McDonnell Douglas to qualify percussion-primed LW30 ammo for the AH-64
  - Two prototype ammunition variants: XM949 (HEDP) and XM950 (TP)
  - Utilized design concepts from 25mm M242 Bushmaster® Automatic Cannon on Bradley IFV
  - U.S. Army test fired over 4,000 rounds without incident (summer 1988)
  - Additional 2,500 rounds fired at hot and cold temperatures without incident (1988)
Why Percussion Prime?

- Hazards of Electromagnetic Radiation to Ordnance (HERO)
  - OP 3565 Defines precautions and procedures in RF environments
  - LW30mm ammo suite for the M230 cannon uses PA520 low-voltage electric primers
  - M788 and related cartridges were rated SUSCEPTIBLE in U.S. Navy tests (1983)
    - Susceptibility applies to shipboard operations within HAZ/RAD environment
    - Risk is mitigated during storage and transport by standard packing configuration

- Percussion-primed ammunition eliminates HERO concerns for operation near radar for shipboard applications
  - XM949 and XM950 use M36A2 percussion primers
  - No electro-mechanical components within the percussion cartridges
Development Re-Initiated

  - Updated drawing package
  - Added visual/manual safety features
  - Procured hardware for qualification tests
    » Two prototype cannons
    » Ammunition handling system
    » System controls

Function tested prototype cannons - Jan 2012
Weapon Summary

- **Functional Description – LW30mm M230 Percussion Prime Chain Gun®**
  - Externally powered, electric drive (3 phase, 115 VAC)
  - Processes percussion prime ammo 30mm x 113mm (XM950, XM949)
  - Positive timing with open bolt function and rotating breech bolt

- **Performance (M230 typical)**
  - 625 25 rds per minute
  - 3,000 lbs peak recoil
  - 132 lbs with barrel
  - 1.1 in. max recoil travel
  - Dispersion: 80% within 3 mrad diameter
  - 2,000m effective range
  - 20,000+ MRBF reliability (projected)

Impact of 20 rd burst at 20m range during functional testing of prototypes procured under N00178-06-D-1006.
1. **Capability to fire percussion-primed ammunition**
   - 23 new components
   - New firing pin forced changes to breech bolt and bolt carrier
   - New contact box forced changes to contact box assembly and forward track

2. **Capability to be manually locked in “SAFE” with visual indication***
   - 10 new components
   - Manual lever access forced changes to receiver

3. **Minimize cannon function and performance impact**
   - Firing rate, recoil, overall weight and envelope unchanged

4. **Minimize integration and logistics impact**
   - 90% of drawing package is unchanged
   - No change to gun control or power interface
   - Integration interfaces unchanged except for manual safety lever
   - Essential maintenance schedule and method is unchanged
   - Standard M230 cannons can be converted to PP variant and back

*Requirement directed and funded under N00178-06-D-1006
Side-by-Side, Bolt Carrier Assembly

M230

M230 Percussion Prime
Side-by-Side, Forward Track Assembly*

M230

M230 Percussion Prime

*Visible manual safety requirement directed and funded under N00178-06-D-1006
Side-by-Side Manual Safety*

M230

M230 Percussion Prime

*Visible manual safety requirement directed and funded under N00178-06-D-1006
Functional Checkout – Live Fire
Potential Uses

- **Primary Armament**
  - Rotorcraft in Shipboard Missions (Fixed forward or turreted)
  - Deck mount operations for smaller patrol ships
  - Remote weapon station mounted on turreted ground vehicle

- **Secondary Armament**
  - Deck mount for larger patrol ships, coastal protection vessels

- **Other**
  - Any vehicle or aircraft that will be based or operated from a naval vessel with HAZ/RAD exposure