U.S. ARMY COMBAT CAPABILITIES DEVELOPMENT COMMAND – ARMAMENTS CENTER

Cannon Caliber Fuze Setter Overview
64th Annual NDIA Fuze Conference

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DISTRIBUTION STATEMENT A:
Approved for public release; distribution is unlimited.
BACKGROUND

• Cannon Caliber Fuze Setter Background
  – 2QFY17, PM-MAS tasked DEVCOM-Armaments Center Fuze Division to design and integrate a contact fuze setter for the XM813 Weapon System in support of the XM1182 High Explosive Air Burst (HEAB-T) program

• XM813 Overview
  – 30x173mm Ammunition
  – 200 Shots per Minute (SPM), Dual Feed, First Round Select, Chain Gun

• Fuze Division performed analysis on XM813 Weapon System
  – Studied munition cycle timing
    • Determined programming message must be completed in under 20ms
  – Determined best location for programming contacts in the feed system
  – Implemented an additional set of power contacts in the feed system
    • Pre-powering munitions, reduces programming time
  – Developed a programming message protocol with munition talkback
  – Authored ICD’s specific to communication protocol and ammo/weapon interfaces
• **Forward Feed Path Modifications**
  – Utilize one power contact, one programming contact per side
  – Fire Control determines feed select & when to send power/program
• Armaments Center authored and control four ICD’s:

  – ICD 13074734 - Cannon Caliber Fuze Setter - REV B
  • Base document outlining power, data, and protocol requirements for setter/munition communication

  – ICD 13076761 - Cannon Caliber Fuze Setter - 30x173mm - REV B
  • Addendum document outlining physical interfaces between the setter/munition including 30x173mm contact bands and XM813 contact locations

  – ICD 13076762 - Cannon Caliber Fuze Setter - 50x228mm - REV XB
  • Addendum document outlining physical interfaces between the setter/munition including 50x228mm contact bands and XM913 contact locations

  – ICD 13076762 - Cannon Caliber Fuze Setter - 30x113mm - REV -
  • Addendum document outlining physical interfaces between the setter/munition including 30x113mm contact bands and M230/XM914 contact locations
• **Programming Message to Fuze**
  – Currently 13 Byte Message
    • Can be expanded to 32 bytes for future - would need to study re-assess contact timing
  – Allows for different methods of air burst timing calculation
  – Up to 7 fuze modes
  – CRC virtually assures no miscommunicated data

• **Response (ACK/NACK) Message from Fuze**
  – Allows the fuze to positively or negatively acknowledge the receipt of a programming message
  – Allows for the communication of (up to 255) error codes
    • For Example: Bad CRC, Value – Out of Range, etc.
CURRENT FUZE SUPPORT OVERVIEW

- **Supporting the following RDT&E Air Burst ammunition efforts:**
  - XM1182 HEAB-T  (30x173mm)
  - XM1204 HEAB-T  (50x228mm)
  - XM1206 HEDP-AB**  (30x113mm)
  - M-SHORAD  (30x113mm)

- **Supporting the following Fuze Setter development efforts:**
  - M230  (30x113mm, 625 spm, Apache Helicopter)
  - XM813  (30x173mm, 200 spm, Stryker)
  - XM913  (50x228mm, 200 spm, NGCV/OMFV*)
  - XM914  (30x113mm, 200 spm, M-LIDS, LRV, M-SHORAD)

* Leading candidate for NGCV/OMFV main armament

** Selectable Point Detonate/Proximity munition (On/Off Programming)
CANNON CALIBER FUZE SETTER DESIGN

Control Room

- Setter (GUI) 
  - Laptop

Up Range

- Fuze Setter
  - 120V AC Power Source
  - 12' Setter Cable
- Weapon System (XM813, XM913, XM914, M230) with Contact Setter
  - 100BASE T - CAT5 or above Setter Cable

Ethernet Cable 100BASE T - CAT5 or above
FUZE SETTER DEVELOPMENT STATUS

• Fuze Setters
  – USG owned design
    • Hardware & Software developed in house
  – 25 units procured
    • Split across all on-going ammunition and weapon development programs
    • Divided amongst contractors, test ranges, and USG
FUZE SETTER GUI

XM813 Setter 2.1.0.0 Mozzarella

Settings
- Mode
  - Airburst
  - Turn Count
  - Altitude (m)
  - Air Pressure (mbars)
  - Air Temp. (°C)
  - Muzzle Velocity (m/s)
  - Target Type
  - Stale Time (ms)
  - Mann Barrel Mode

Power Rail Controls
- Left
  - Feed 1
  - Feed 2
- Right
  - Feed 1
  - Feed 2

Setter Connection
- Disconnect
- Status: Connected
- Firmware: Version 1.5

Setter Status
- Volages
  - System: 24.05V
  - Logic: 3.29V

Data From Round
- 0 Success
- 1 Failure

[06:55:28] Tcp: Attempting to connect...
[06:51:23] Application Started
SETTER VERIFICATION DEVICE (SVD)

30x173mm

50x228mm

30x113mm
XM813 CONTACT FUZE SETTER STATUS

USG Contact Setter Design

- TRL6 Live Fire Demo at APG
- Utilized by defense contractors for XM1182 HEAB-T development
- Transitioned to defense contractor for MRL design improvements
M230 & XM914 CONTACT FUZE SETTER

M230 Fuze Setter

XM914 Fuze Setter
M230 - 12 ROUND BURST
XM914 - 3 ROUND BURST
• Cannon Caliber Fuze Setter successfully demonstrated across multiple weapon systems

• ICDs in place to outline power, data, and protocol requirements and setter / munition interface to support multiple calibers of air burst ammunition

• Fuze Setter Hardware GFE’d to multiple contractors, test ranges, and USG entities to support all on-going ammunition and weapon development programs