



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

## Cannon Caliber Fuze Setter Overview

64<sup>th</sup> 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

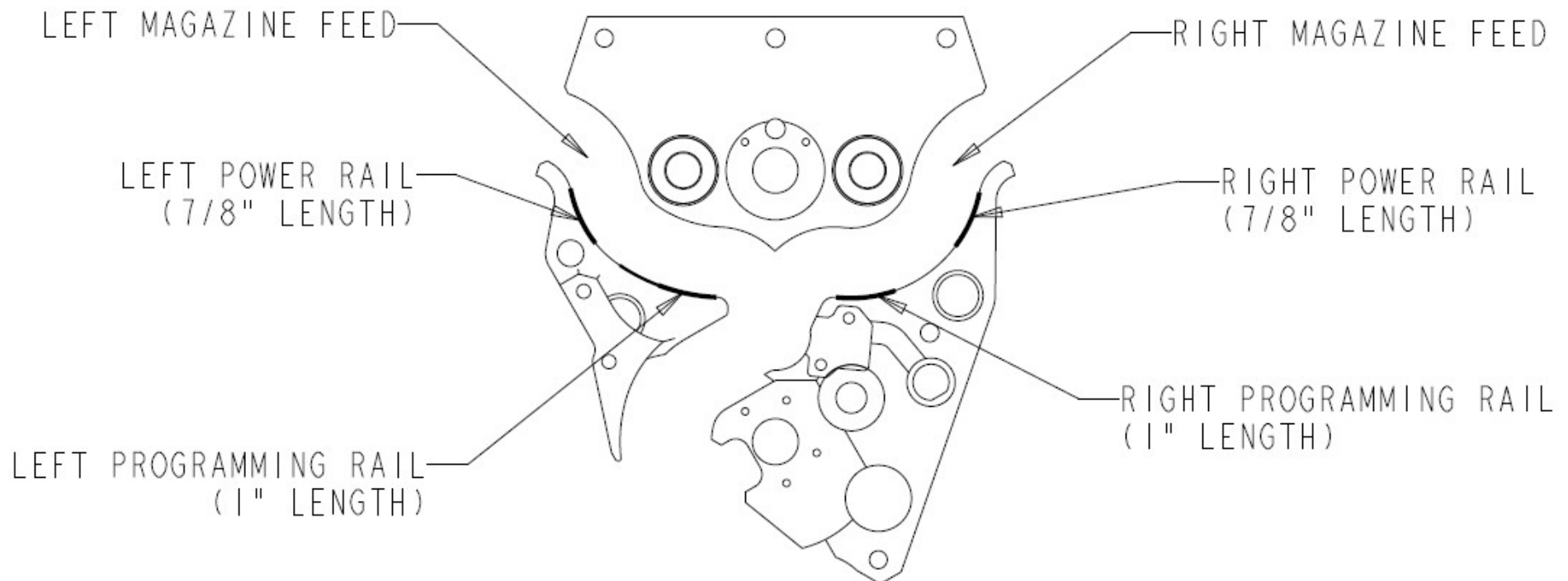


## XM813 WEAPON MODIFICATIONS



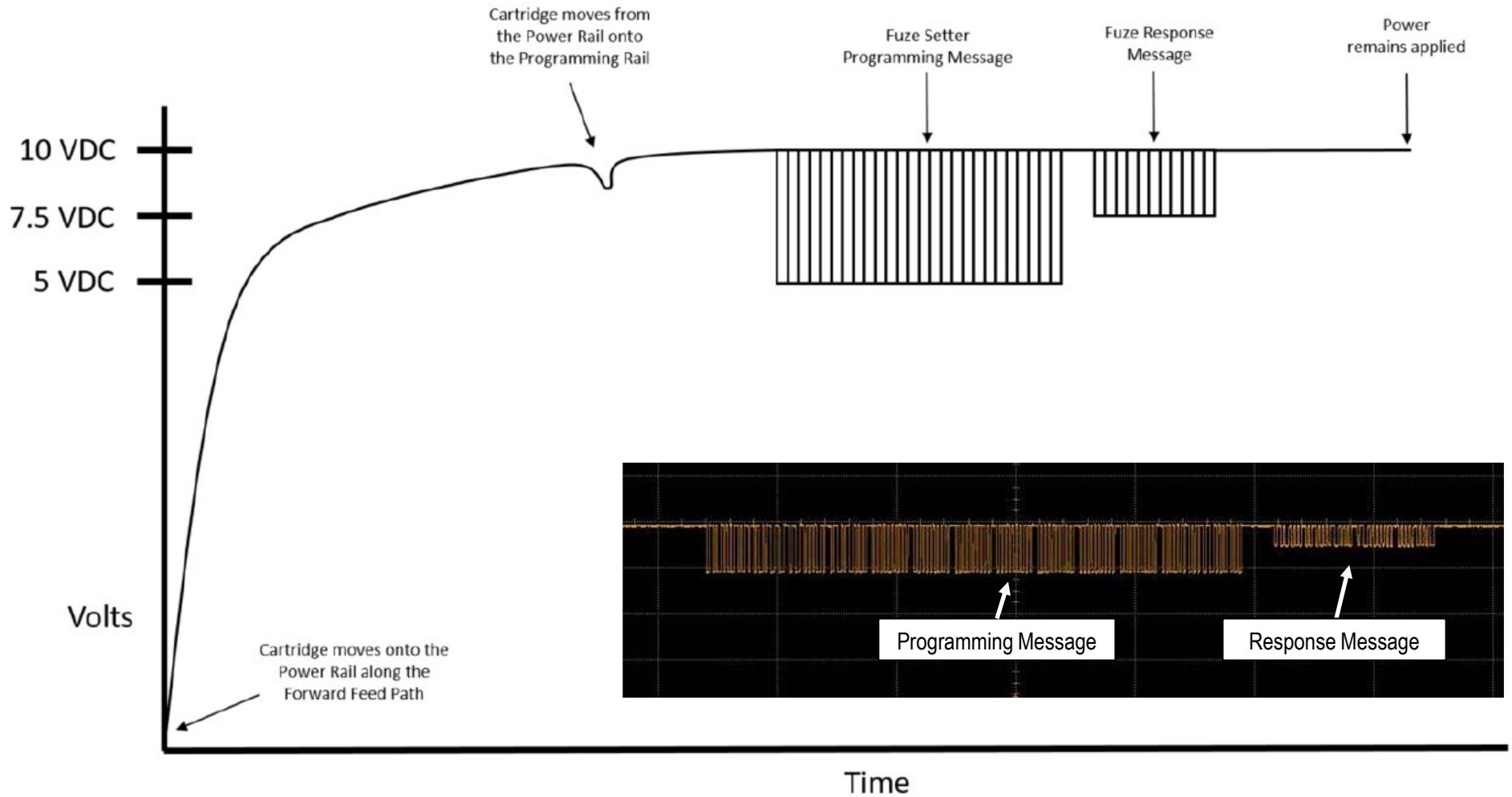
- **Forward Feed Path Modifications**

- Utilize one power contact, one programming contact per side
- Fire Control determines feed select & when to send power/program





# PROGRAMMING MESSAGE TIMELINE





## CANNON CALIBER FUZE SETTER ICD



- **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



## SOFTWARE / PROTOCOL



- **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



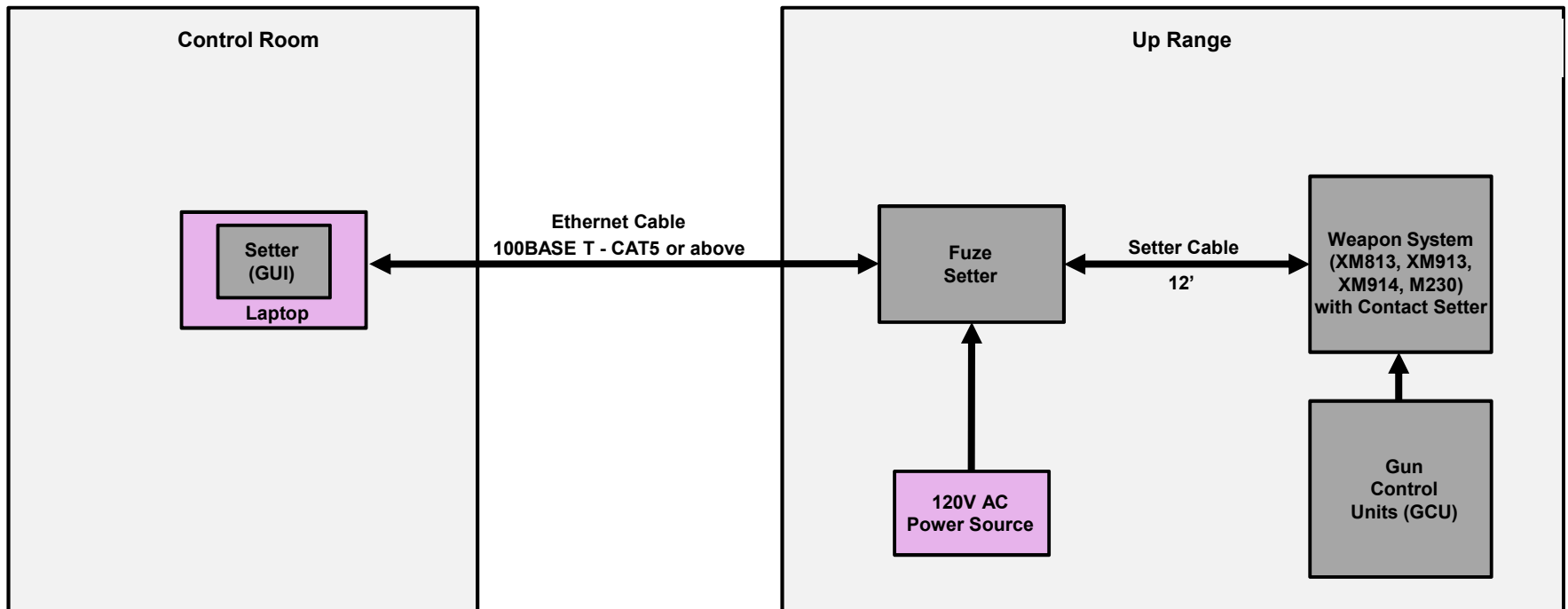
- **Supporting the following RDT&E Air Burst ammunition efforts:**
  - XM1182 HEAB-T (30x173mm)
  - XM1204 HEAB-T (50x228mm)
  - XM1206 HEDP-AB\*\* (30x113mm)
  - M-SHORAD (30x113mm)
  
- **Supporting the following Fuze Setter development efforts:**
  - M230 (30x113mm, 625 spm, Apache Helicopter)
  - 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



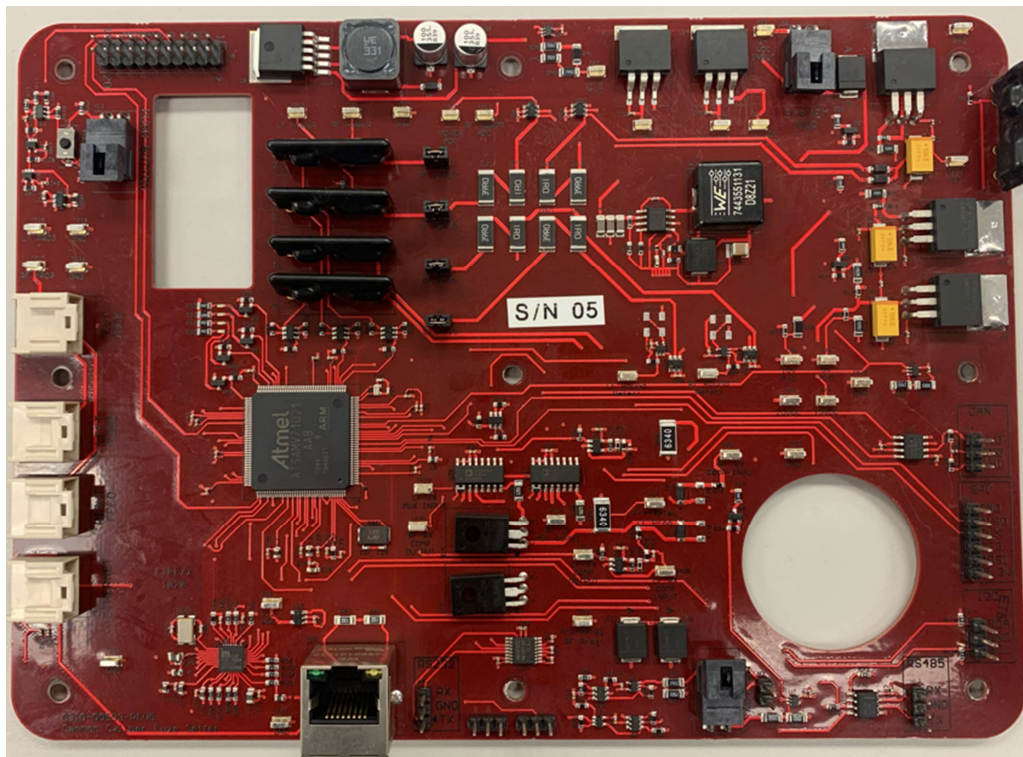




## FUZE SETTER DEVELOPMENT STATUS



- **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

**Set Fuze**

**Settings**

**Mode**  
Airburst

Time of Flight (s): 2.5

Tum Count: 2500    Altitude (m): 300    Air Pressure (mbars): 900

Air Temp. (°C): 27    Muzzle Velocity (m/s): 980    Target Type: Three

Stale Time (ms): 0     Mann Barrel Mode

**Power Rail Controls**

Left: Feed 1, Feed 2, Left Feed Power  
Right: Feed 1, Feed 2, Right Feed Power

All Power Off

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

**Setter Status**  
Voltages: System: 24.05V    Logic: 3.29V  
Setter Power    Key Switch  
Disable Setter Power    Advanced

**Data From Round**  
0    Success    Failure    Clear Display

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[06:55:29] Tcp: New Connection Established.  
[06:55:28] Tcp: Attempting to connect...  
[06:51:23] Application Started



# SETTER VERIFICATION DEVICE (SVD)



**30x173mm**



**50x228mm**



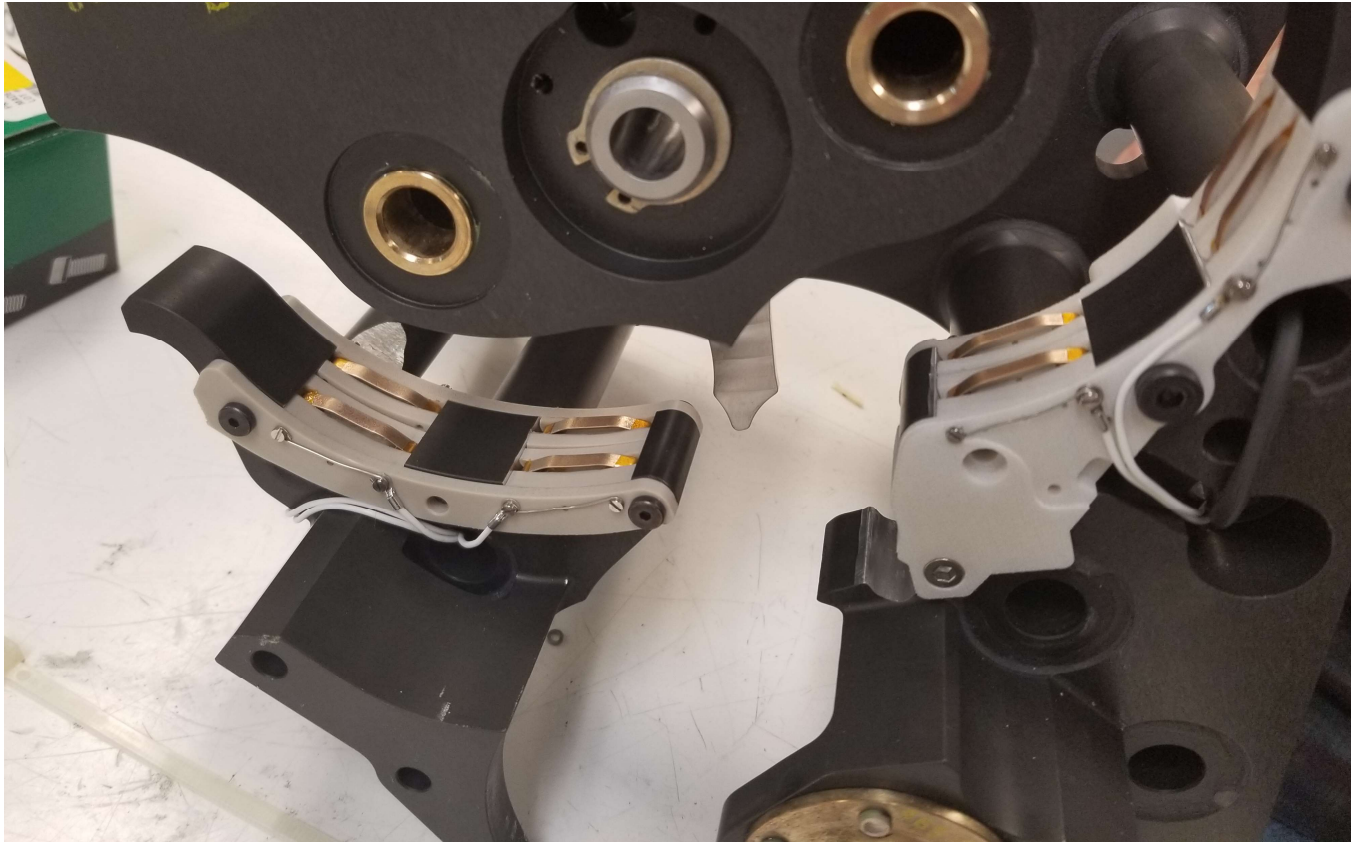
**30x113mm**



## XM813 CONTACT FUZE SETTER STATUS



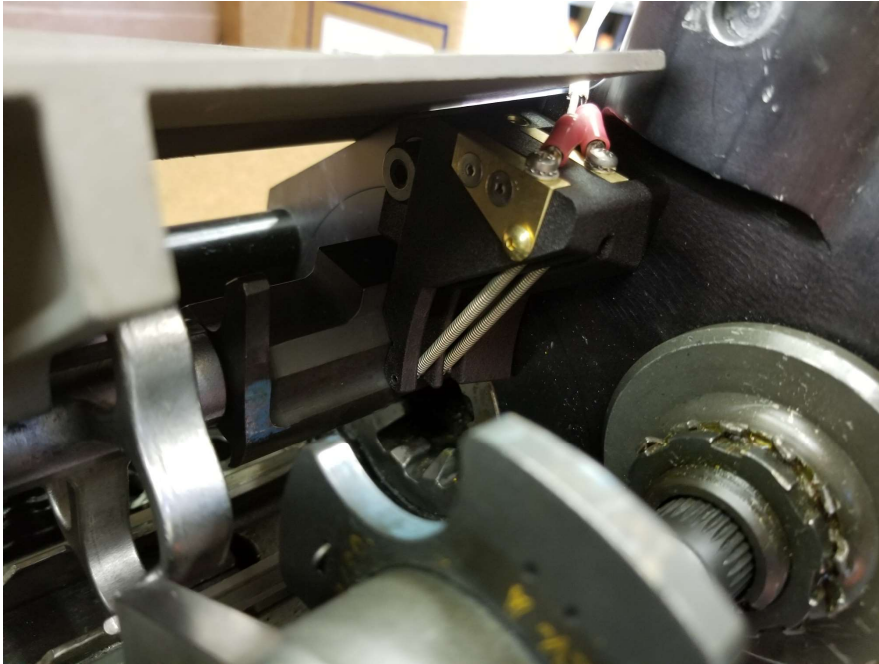
### USG Contact Setter Design



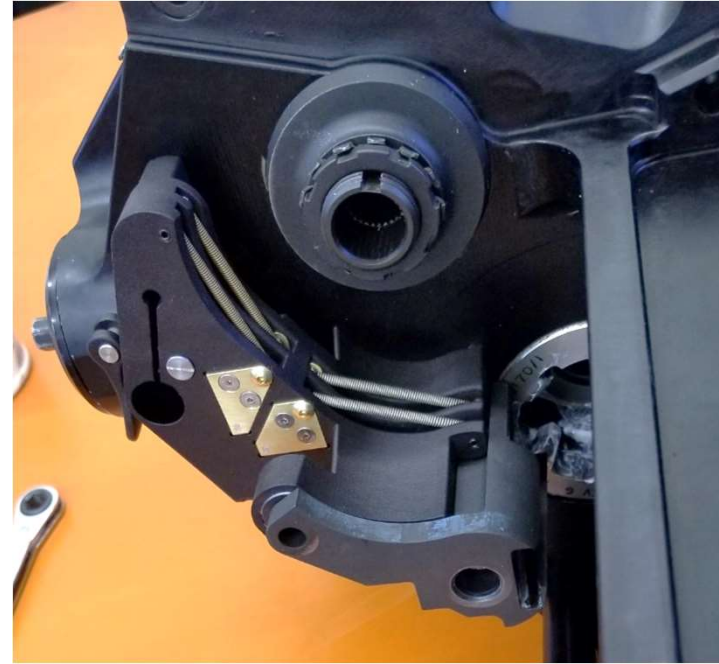
- **TRL6 Live Fire Demo at APG**
- **Utilized by defense contractors for XM1182 HEAB-T development**
- **Transitioned to defense contractor for MRL design improvements**



# M230 & XM914 CONTACT FUZE SETTER



**M230 Fuze Setter**



**XM914 Fuze Setter**

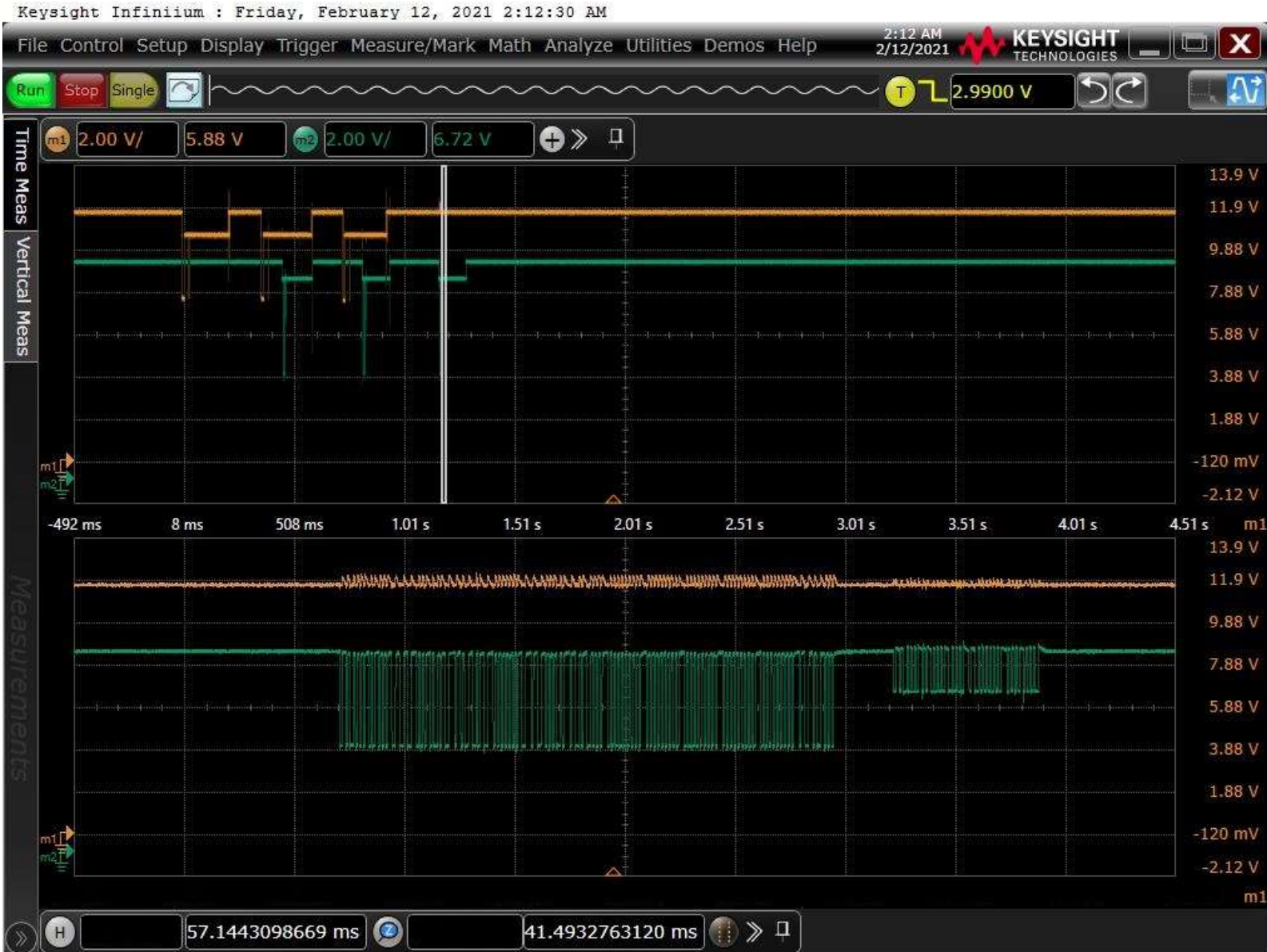


# M230 - 12 ROUND BURST





# XM914 - 3 ROUND BURST





## SUMMARY



- **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**