A Wild Ride – for a wild & weird cartridge
NDIA ARAMAMENTS MAY 10, 2018
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A Wild Ride because …..
1) Extremely unique cartridge – numerous technical challenges
2) Long personal/company history going back over 35 years with my father – Brass Extrusion Labs Ltd.(B.E.L.L.) and MAST Technology
3) On its *last production run* for the last 20 years, including this current run on a 5 year IDIQ
4) Tail wagging the dog on velocity – cartridge sets rocket velocity, in some cases. Ballistic match to the rockets.
5) MAST was founded to go after this contract
6) This was Brass Extrusions first intro into DOD contraxcts
Overall History –
- Israeli Design – unverified
- Radaway Green Build in Late 1970’s
- Brass Extrusion Labs Limited Build in 1980’s for McDonald Douglas
- MAST founded July 1990 to go after SMAW Cartridge
- MAST Build for ATK in 1993
- MAST lost 1st Army contract 1994 only to return after competitor T/D
- Multiple MAST builds including current 5 year for Nammo-Talley to US Army
Personal History –  
B.E.L.L. - Early 80’s Target Pit Crew  
B.E.L.L. - Mid 80’s Packing into 20 Rd boxes  
MAST – Mid 90’s machine operator  
MAST – Mid 90’s Outdoor Range Ballistician  
MAST – Late 90’s Program Manager  
MAST – Early 2000’s B/P & PM  
MAST – Late 2000’s B/P & SME  
MAST – Late 2010’s B/P & SME
Cartridge Purpose –
1) Spotting Cartridge for SMAW Rocket – HEDP, HEAA & CP
2) Ballistic Match to 83mm Rocket – same Arc and trajectory
3) Lasers not developed in 70’s and 80’s
4) Lasers don’t work well in snow, rain or other interference
5) Spotting Cartridge act similar to rocket in wind & environmental
6) Similar to AT4 and other shoulder launched
9mm SMAW Weapon

- Optical Sight
- Rear Iron Sight
- Forward Iron Sight
- Spotting Rifle
- Forward Grip
- Trigger
- Folding Shoulder Rest
- Folding Bipod
83mm SMAW Rockets

**LENGTH**

- Weapon ready-to-fire with HEDP: 54 in. (1372 mm)
- Weapon ready-to-fire with HEAA: 54 in. (1372 mm)
- Launcher as carried: 32.5 in. (825 mm)
- Encased rocket as carried: 29.5 in. (749 mm)
- HEAA: 33.2 in. (843 mm)

**WEIGHT**

- 23.9 lb. (13.13 kg)
- 30.7 lb. (13.95 kg)
- 16.6 lb. (7.5 kg)
- 13.1 lb. (5.95 kg)
- 14.4 lb. (6.4 kg)

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CTG DETAILS - Custom Projectile

- Purpose - Bullet Weight
- Ballistic Match to Rocket
- Copper Jacket Crimped on to aide feeding from magazine to weapon
- Tracer for tracking
TDP/Spec Issue – Trace burn in lead bullet. Lead melts – who knew?
- 6 seconds burn is not uncommon
- Static Burn images below. 100% cannister separation in flight at 350-400M
Purpose – 22 Hornet
- Hi-low system to contain propellant in controlled and have more consistent propellant burn & velocity
- To give ‘blow back’ to allow the weapon bolt to function/cycle backwards
1) Blow back of Hornet required to function Semi-automatic Spotting Weapon – pictured is ideal state
2) TDP requires that hornet backs out (to cycle bolt), and gas escape is evident
TDP/Spec failure
- no gas escape = lockup = failure
  - result is considerably higher velocity
- Ignore primer backout for this slide (best picture available to show lockup)
- Often lockup also results in primer backout
CARTRIDGE TECHNICAL CHALLENGES

TDP/Spec failure – primer backout
Dropped primer – as always bad and could cause weapon failure
Rosette crimp – the secret sauce to ensure successful hornet backout without lockup or primer backout.

1) Asymmetrical crimp to ensure that the pedals rupture in an inconsistent manner.

2) Later we added a resize to ensure/control that the pedals open and allow the case to push backward to cycle the bolt.
CARTRIDGE TECHNICAL CHALLENGES
Old weapon issues created some live fire issues. MAST ended up doing weapon testing which resulted in finding a few issues with weapon.

One issue was springs that were delivered to the drawing however after 50 rounds would fail.

Pictured to the right is our weapon spring testing setup.
SMAW CARTRIDGE
What is one thing you would change about this presentation?