

TEXTRON Systems

CASED TELESCOPED SMALL ARMS SYSTEMS

May 2014
NDIA Joint Armaments Conference

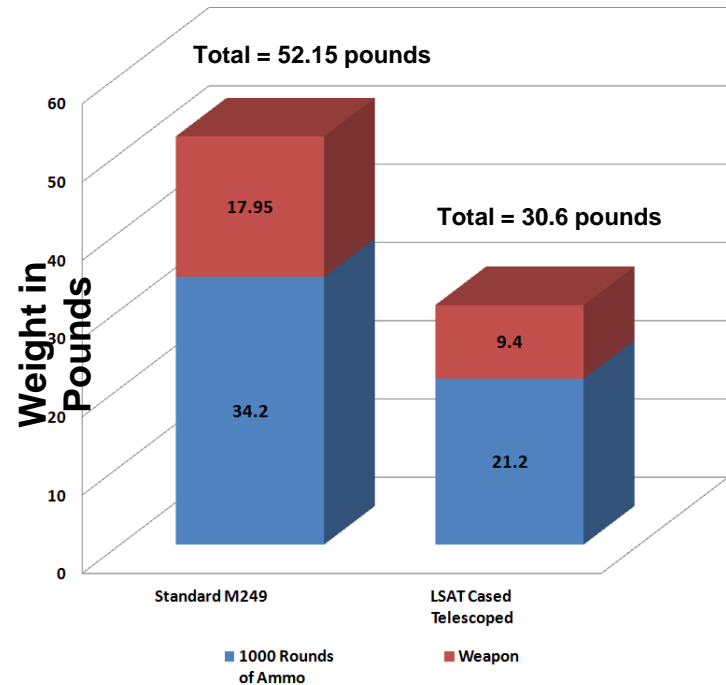
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Introduction

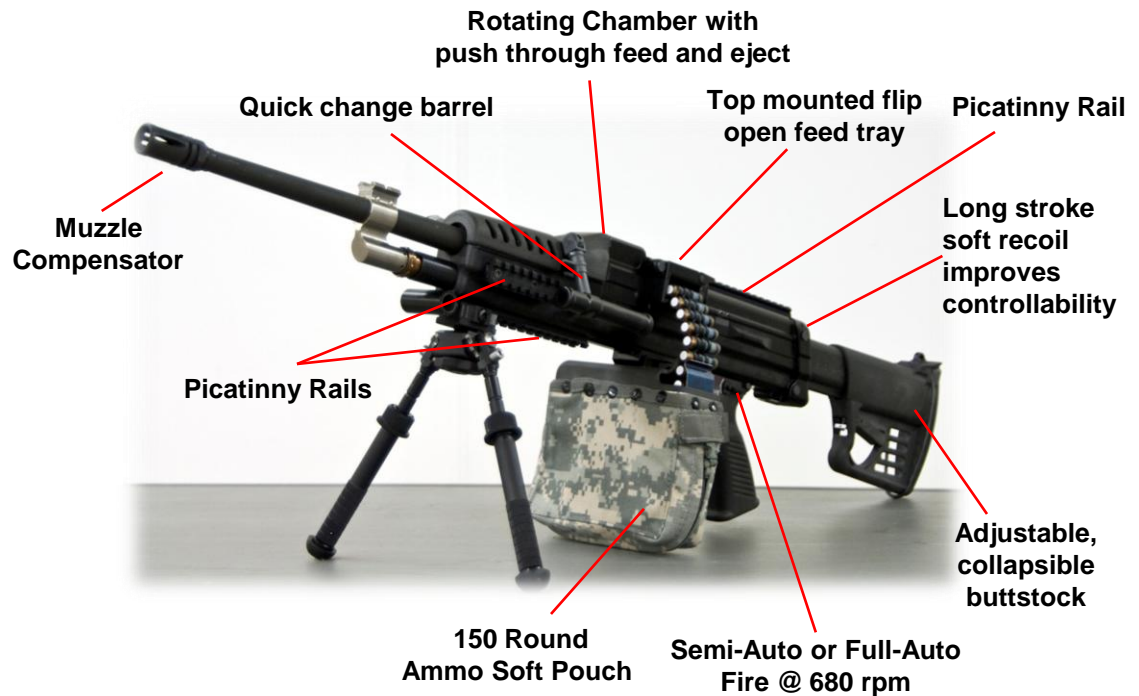
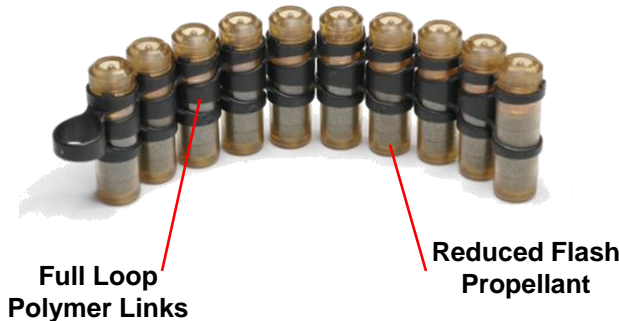
- Acknowledgements
- Program/technology updates since 2012 NDIA Joint Armaments Conference
 - 5.56mm Lightweight Small Arms Technologies (LSAT) User Assessments
 - 7.62mm Cased Telescoped ammunition feasibility demonstration
 - Enhanced Cased Telescoped systems- Rapid Innovation Fund

5.56mm Light Machine Gun and Cased Telescoped Ammunition Overview



21.5 pounds in weight savings (41%) for SAW Gunner & 12% reduction in ammunition volume

Matches muzzle velocity of current ammunition with improved dispersion



Distribution A: Approved for Public Release, Distribution is Unlimited

Cased Telescoped (CT) Ammunition and Light Machine Gun (LMG) Advantages

- **Increased Weapon Performance:**

- Reduced felt recoil compared to current M249 SAW
- Improved accuracy of weapon system
- Designed for increased reliability than M249 SAW
- Designed for reduced weapon maintenance
- Thermal management decreases risk of cook-offs
- Selectable semi-automatic mode increases weapon versatility and reduces ammunition consumption



- **Reduced Logistical Burden:**

- 55% more ammunition transported for same weight
- 12% reduction in volume

- **Potential Operational Impacts:**

- Decreased weight provides increased mobility, survivability and effectiveness for:
 - Automatic Rifleman (most heavily loaded and least mobile member of squad)
 - The entire Squad



Current Cased Telescoped Portfolio

Cased Telescoped (CT) Light Machine Gun:

- LMG and 5.56mm CT Ammo TRL 7 testing complete
- 37% ammo/link weight reduction / 12% volume reduction
- LMG provides 48% weight reduction from M249 SAW (8.5 pounds lighter)
- Over 100,000 rounds of 5.56mm CT ammo made
- Pilot production facility for ammunition is operational
- Three operational assessments conducted:
 - Military Utility Assessment (SEP 2011)
 - USASOC Assessment (OCT 2012)
 - DNI/LOE (AUG 2013)



CT Light Machine Gun and 5.56mm CT Ammunition



Cased Telescoped (CT) Carbine:

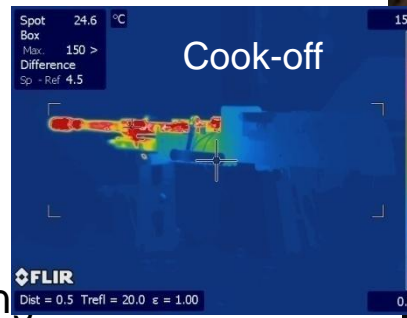
- Carbine action - TRL 5 completed in August 2011
- M4 size & weight, with 1" longer barrel
- With buttstock folded, weapon < 25" long
- Use of CT Ammo saves 2.5 lbs per combat load



Cased Telescoped Carbine Action

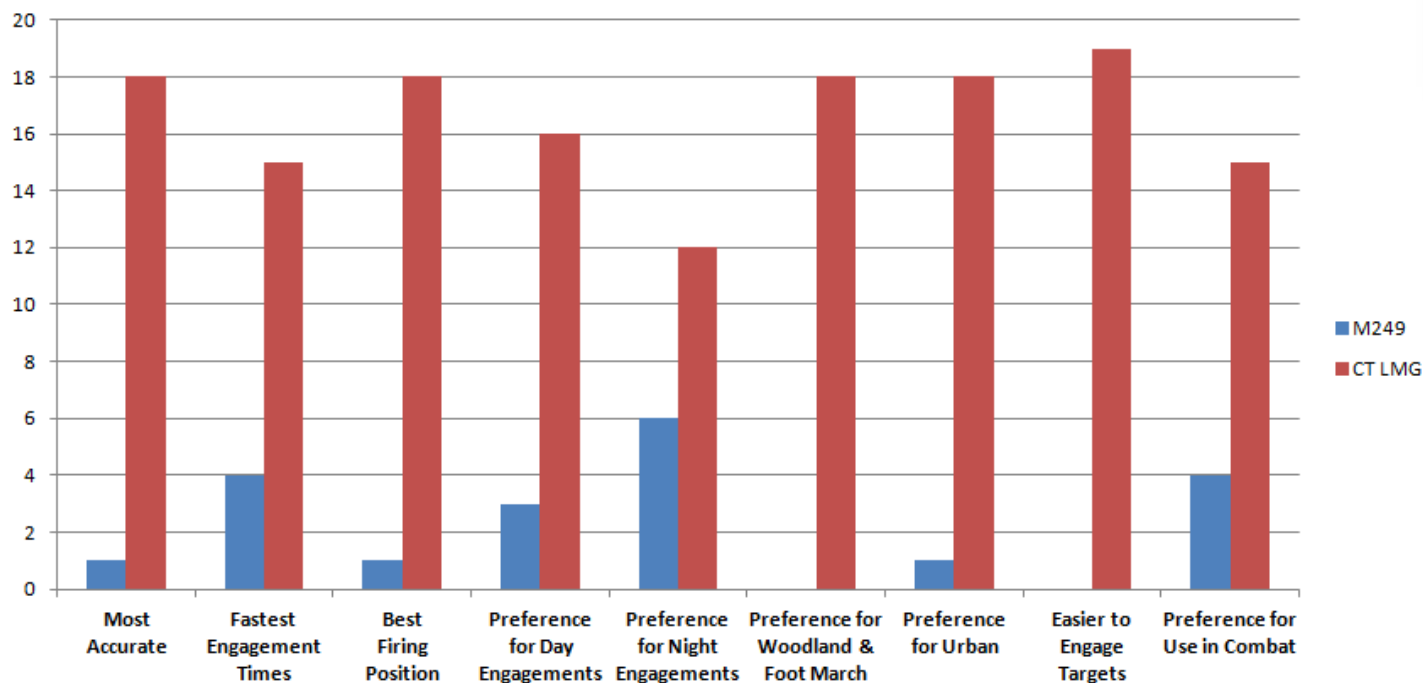
LSAT Technology Readiness Level

- **System assessed at TRL7**
 - Based on standard qualification tests
 - System performed well, some follow-up improvements need to be retested*
- **Assessments included:**
 - Reliability - Durability
 - Accuracy - Dispersion
 - High/Low Temp - Cook-off
 - Humidity - Salt Fog - Rain* - Icing
 - Mud - Sand & Dust*
 - Rough Handling - Loose Cargo
 - Orientation - Belt Pull
 - Unlubricated - Fouling
 - Flash - Noise - Waterproofing
 - Chemical Compatibility



LSAT Military Utility Assessment

- **Conducted September 2011 at Ft. Benning by Maneuver Center Battle Lab**
 - 19 soldiers (9 Infantry & 10 MP's), plus 2 from 3/75th Rangers in a separate
 - 2+ weeks, 8 CT LMGs under test, approximately 23,000 rounds fired
 - Individual comparative analysis of CT LMG against baseline M249 SAW
 - User surveys done after every event, and After Action Report at close out
- **Summary Findings:**



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USASOC LSAT Assessment

- **USASOC assessment held October 2012 – January 2013 at Ft. Bragg**
 - Contractor/Gov't team provided initial training and maintenance instructions
 - Users fired 12,000 rounds of ammunition across 4 weapons
 - Variety of assessments performed – focus on ergonomics, accuracy, durability
 - Users did their own cleaning, maintenance and repairs (no support needed)
 - AAR held to discuss results, future plans



Configuration of Weapons



Results of Day 1 Testing

Dismounted Non Network Enabled Limited Objective Experiment

- **Dismounted Non Network Enabled Limited Objective Experiment (DNNE LOE)**
 - Sponsored by ARCIC, driven by MCoE capability gaps
 - Designed to assess (non network) capability improvements for small units
 - Exercise began 6 August, finished 24 September 2013
 - Included 13 “technologies” (of which LSAT CT Ammo & LMG was one)
 - EXFOR was entire dismounted platoon (3 rifle squads, 1 weapon squad)
 - Series of range events: CQB, Long Range, Squad Live Fire, Suppressive Fire
 - Capstone 72 hour force on force event, base case compared to experimental case
 - LSAT provided 7 weapons, 9,700 ball rounds, and 8,400 blank rounds
- **Results for LSAT:**
 - Squads employing the LSAT CT Light Machine Gun (LMG) [and M4A1+] had increases in lethality during short and long range engagements, improvements in speed of engagement and shot placement.
 - Soldiers attributed better mobility to the machine gun’s reduced size and weight in comparison to the current M249
 - Weight and recoil reduction provide more precise fires on the objective particularly when AR gunners are firing from standing and kneeling positions
 - Automatic Riflemen were able to move quicker because of the lighter weight, with a positive impact on key AR missions

Preliminary 7.62mm Cased Telescoped Ammo Results

- Over 250 rounds fired from test barrel
- Achieved match to M80 performance specs:
 - Muzzle velocity
 - Chamber pressure
 - Dispersion
- Demonstrated function
 - -65F to +160F
 - Structural integrity
 - Propellant ignition
 - Sealing
- Less propellant than legacy cartridge
 - Flash suppression included
- On-going/planned activities
 - Endcap refinements (shot start)
 - Propellant optimization
 - M80A1 projectile integration



Fired 7.62mm CT Cartridges

| | 7.62mm Brass | 7.62mm CT SP1D | 5.56mm Brass | 5.56mm CT SP3 |
|----------------------------------|--------------|----------------|--------------|---------------|
| Charge Distribution | Loose | Compacted | Loose | Compacted |
| Length [in] | 2.8 | 2.03 | 2.26 | 1.56 |
| Charge Weight [grains] | 46 | 37 | 27 | 23 |
| Cartridge Weight [grains] | 372 | 253 | 189 | 127 |
| % Weight Savings: | | | | |
| Cartridge | N/A | 33% | N/A | 33% |
| Cartridge + Link | N/A | 39% | N/A | 38% |
| % Volume Reduction | N/A | 18% | N/A | 12% |

Rapid Innovation Fund Efforts

- Rapid Innovation Fund provides DoD with the authority to fund programs that facilitate the rapid insertion of innovative technologies into military systems
- Broad Agency Announcement issued July 2012, White Papers received in September 2012, final proposals received in June 2013
- Two approved proposals for Cased Telescoped technologies:
 - 5.56mm Carbine
 - 7.62mm Ammunition & Medium Machine Gun
- These two proposals were merged to provide more efficiency
 - New task was added for a design optimization study for ammunition size/weight and weapon trade offs
 - Will NOT be limited to a 5.56mm Carbine, could be 7.62mm or other
 - 7.62mm CT ammo will definitely be developed, with other calibers TBD
- Award was made on 29 January, with kickoff meeting held 19 February to define requirements for the trade study

Weight Reduction = Capability

Legacy 5.56mm:

M249 + 5.56mm Brass Ammo



M249: 17.5 lbs
600 rds Ammo: 20.3 lbs
Total = 37.8 lbs

Cased Telescoped 7.62mm:

CT MMG + 7.62mm CT Ammo



CT MMG: 18 lbs (estimated)
600 rds Ammo: 23.1 lbs
Total = 41.1 lbs

Difference = 3.3 lbs
or, carry 85 less rounds for the same 37.8 lbs