



# Test Techniques for Next Generation Weapon Suppressor Development



***TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.***

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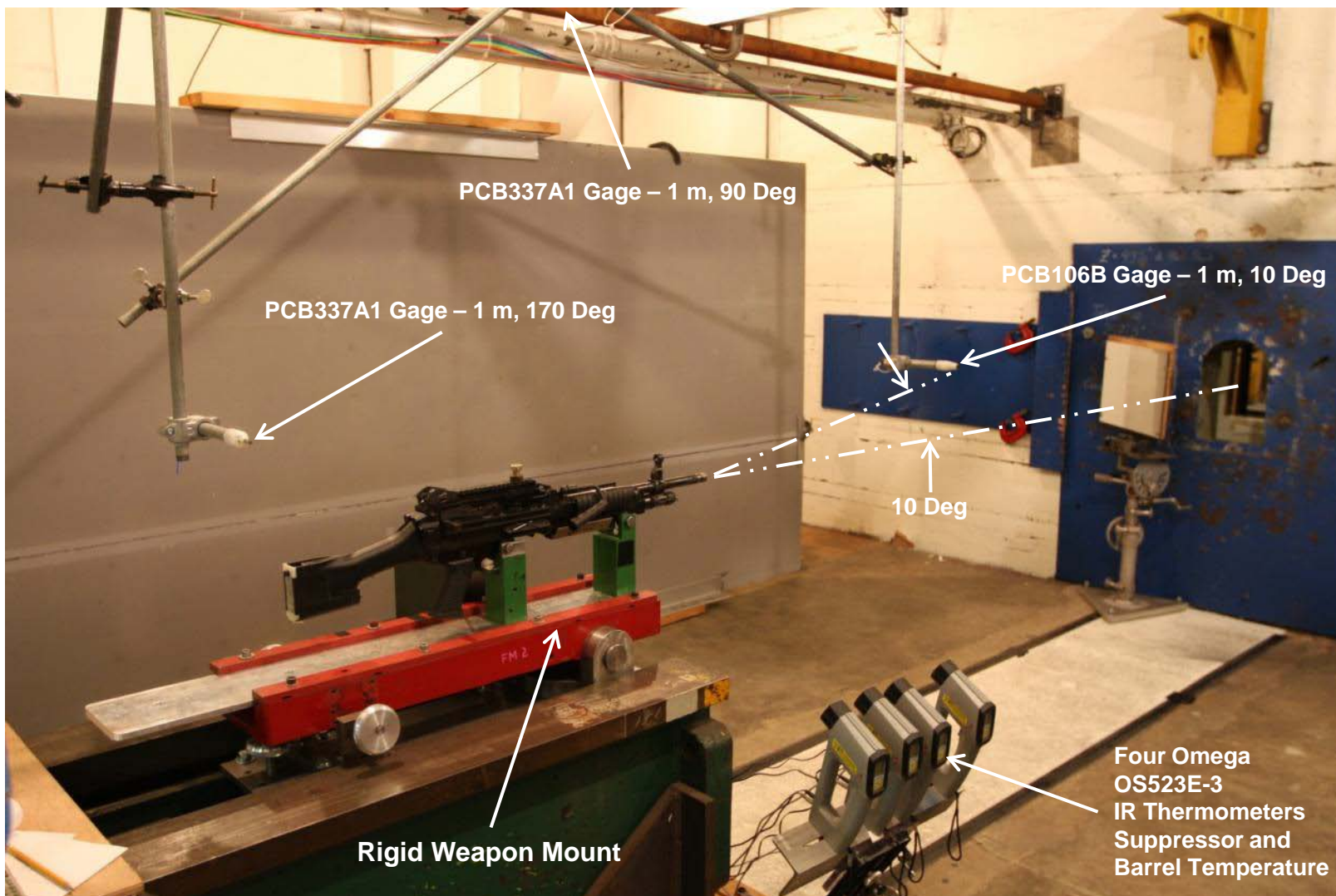
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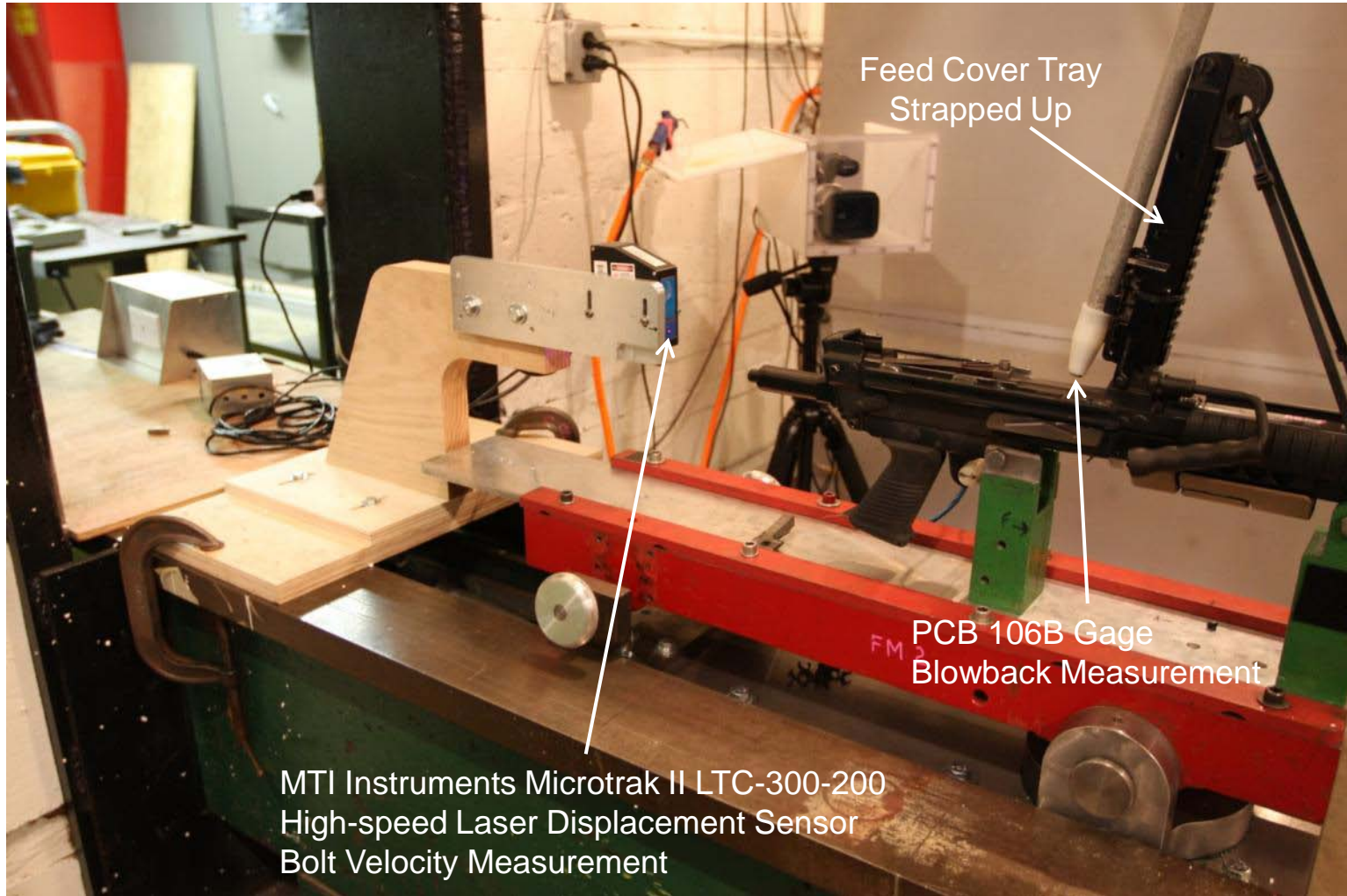
- Suppressors Used to Reduce Weapon Noise
- Bolt Action/Semi-Automatic Weapon Suppressors
  - Relatively simple
  - Can focus on maximum sound reduction
- Automatic Weapon Suppressors
  - Pluses
    - Improved command and control
    - Reduced hearing loss
    - Reduced signature
  - Minuses
    - Difficult to engineer
    - More flash
    - More heat
    - Increased blowback, noxious gases and fouling
    - Increased bolt velocity
    - Reduced weapon reliability

- **Systems Approach Required**
  - Balance of sound, flash, thermal, blowback, weapon powering, and dispersion
  - Good designs balance all six
- **Modeling and Simulation**
  - CFD to evaluate sound, blowback, thermal, gas temperature, and weapon powering
  - More insight into critical performance features
  - Quick way to evaluate and improve designs
- **Testing**
  - Validates results and determines absolute performance

- Current Testing For Bolt Action/Semi-Automatic Weapons
  - Sound measurement
  - Dispersion measurement
- Required Measurements For Automatic Weapons
  - Sound measurement
  - Flash measurement
  - Thermal measurement
  - Weapon blowback measurement
  - Weapon powering measurement
  - Dispersion and POI shift measurement



# Test Setup – Blowback ARL - AEF

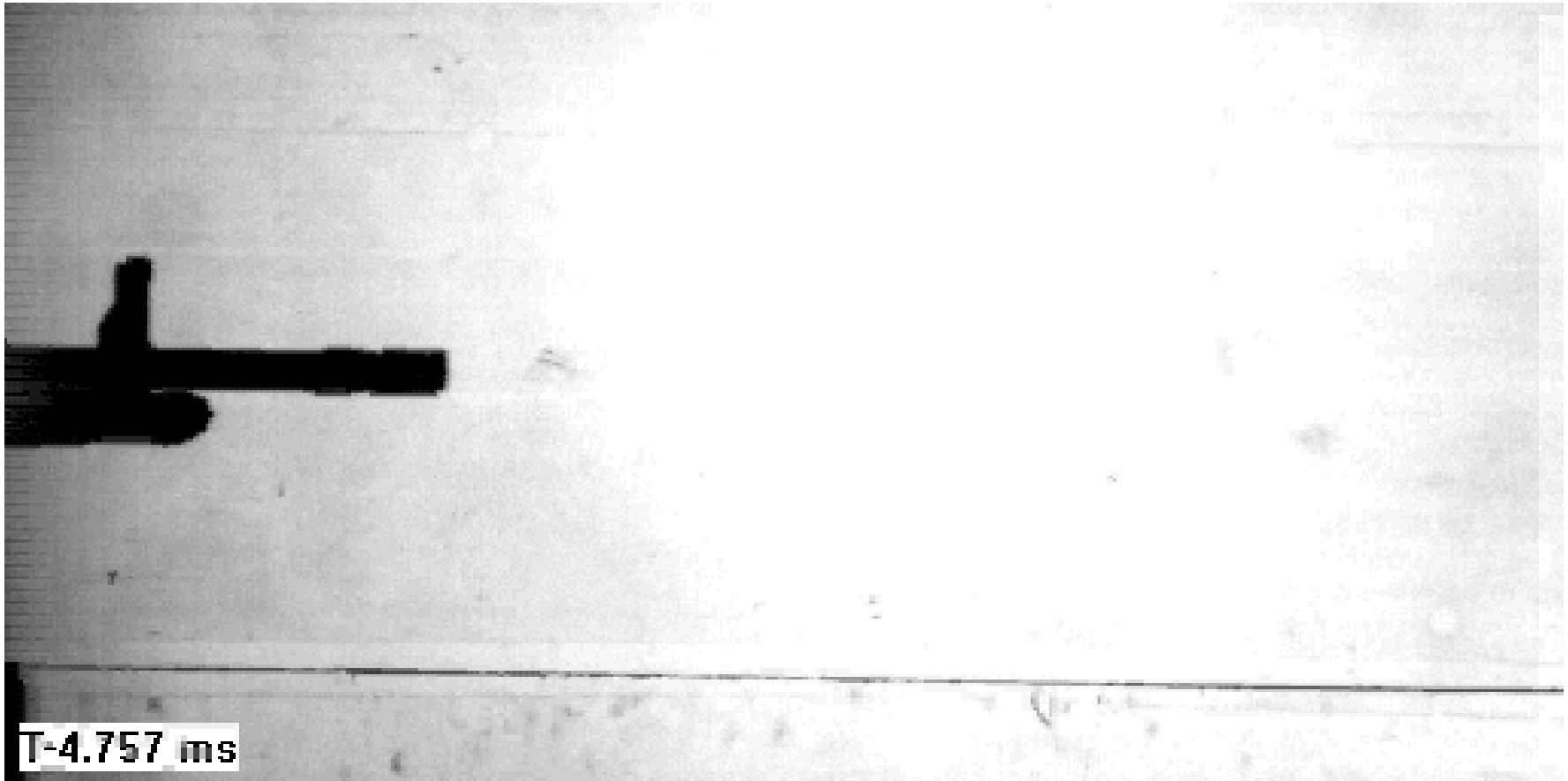


MTI Instruments Microtrak II LTC-300-200  
High-speed Laser Displacement Sensor  
Bolt Velocity Measurement

Feed Cover Tray  
Strapped Up

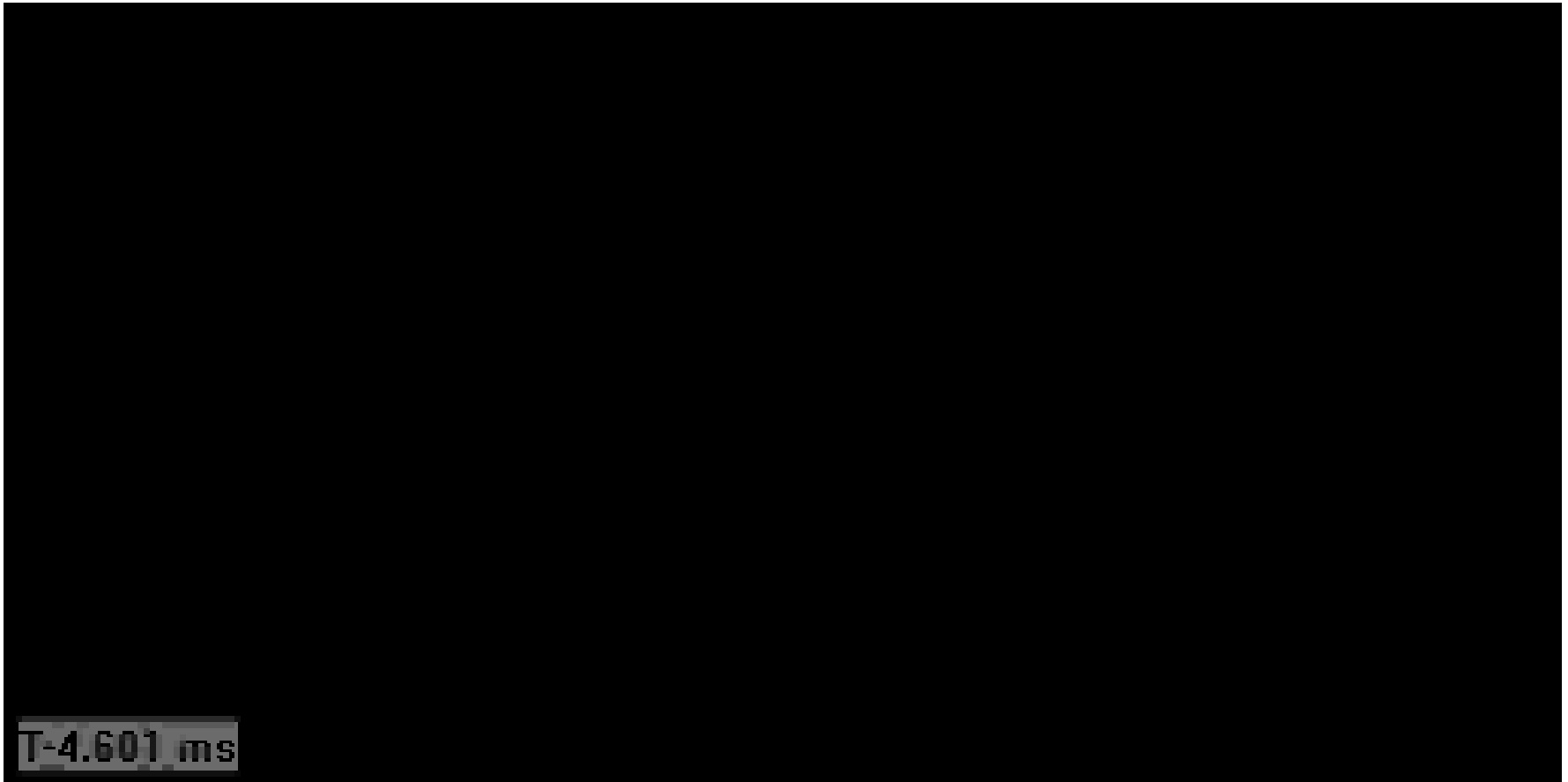
PCB 106B Gage  
Blowback Measurement

# High-Speed Shadowgraph Standard Flash Hider





# High-Speed Flash Video Suppressor A



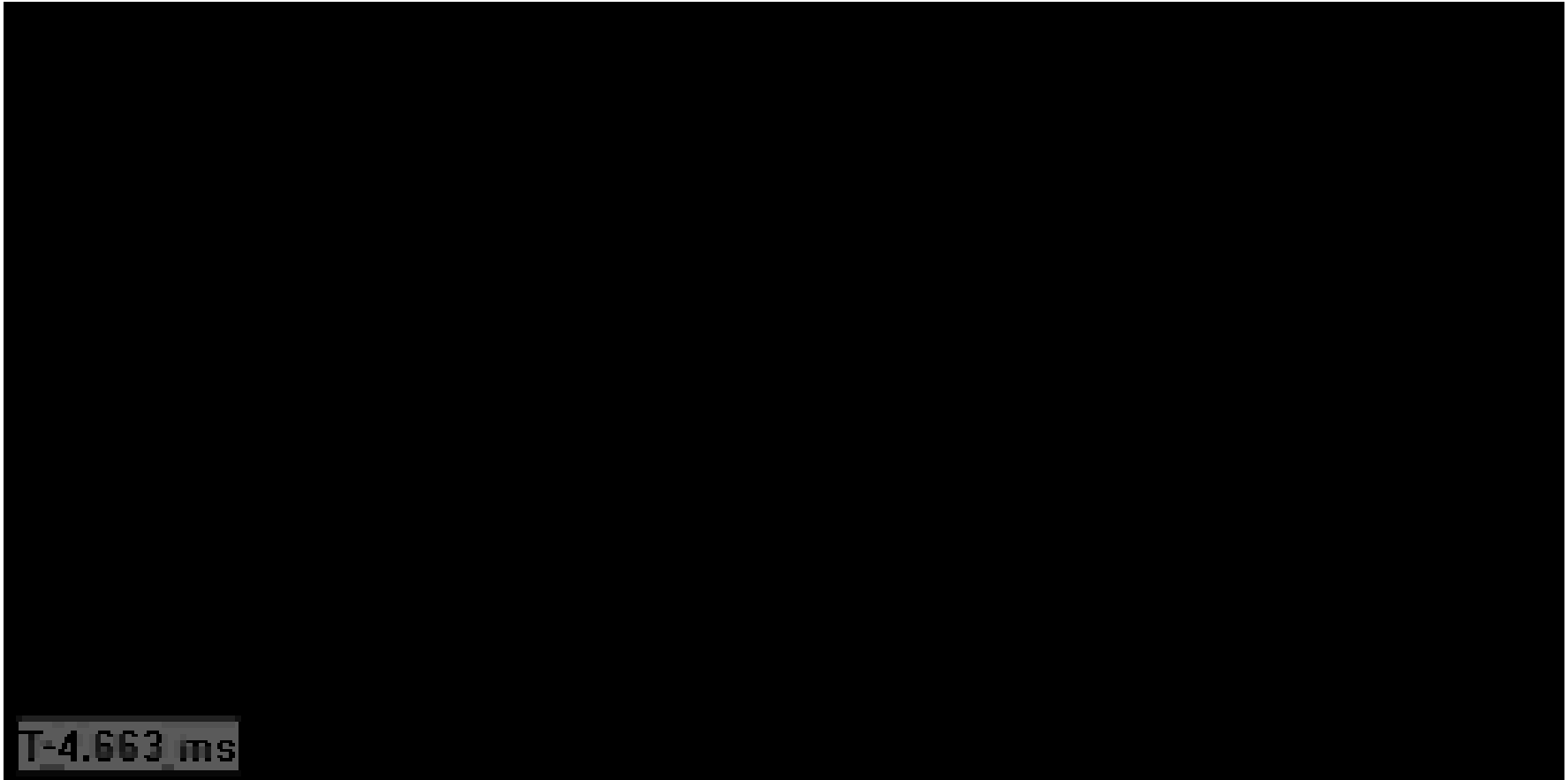
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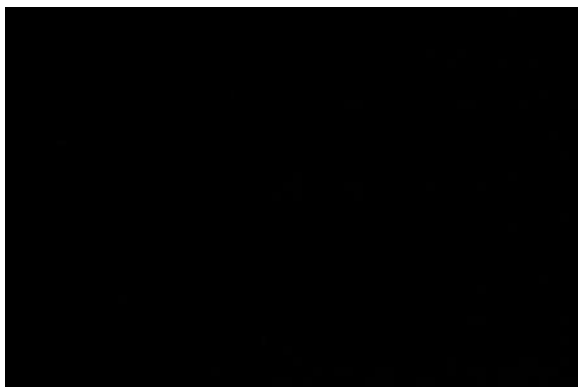
# High-Speed Flash Video Suppressor B



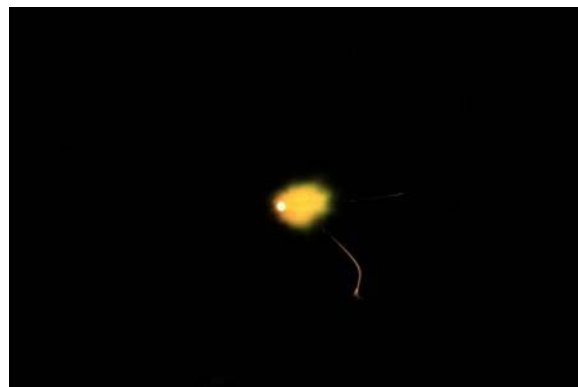
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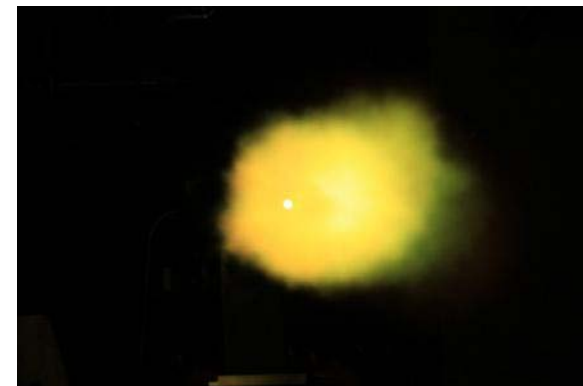
**Standard Flash Hider**



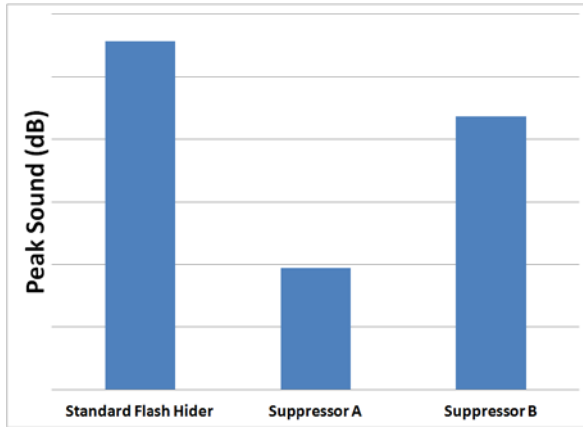
**Suppressor A**



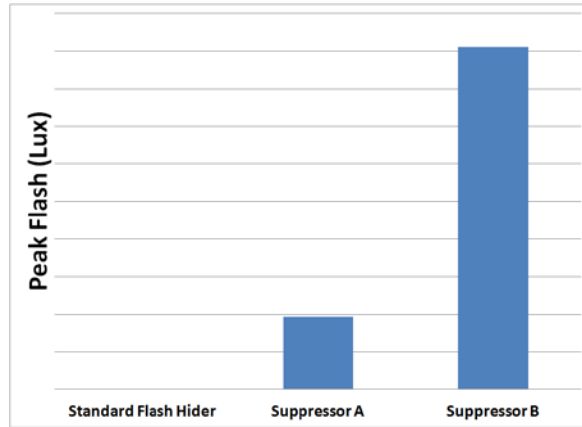
**Suppressor B**



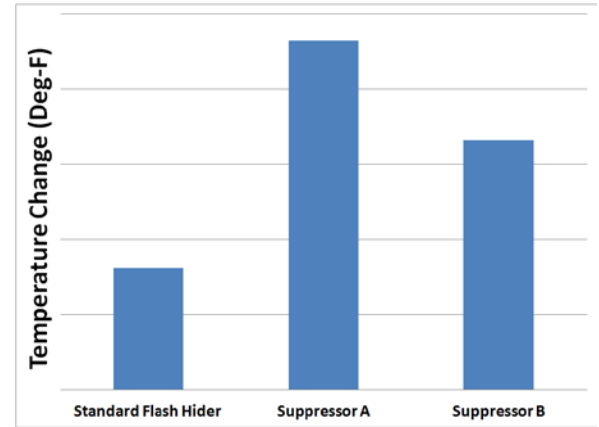
Max Sound at Shooter's Ear



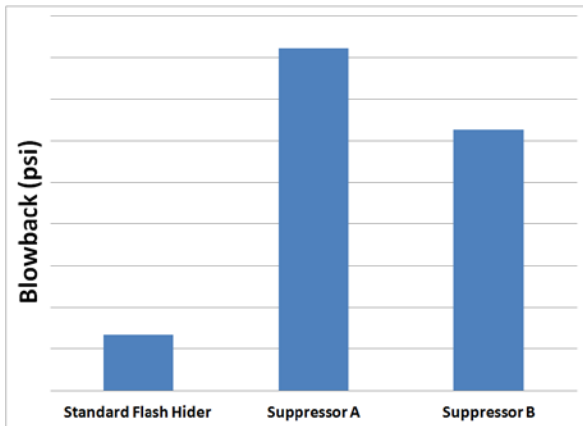
Max Flash



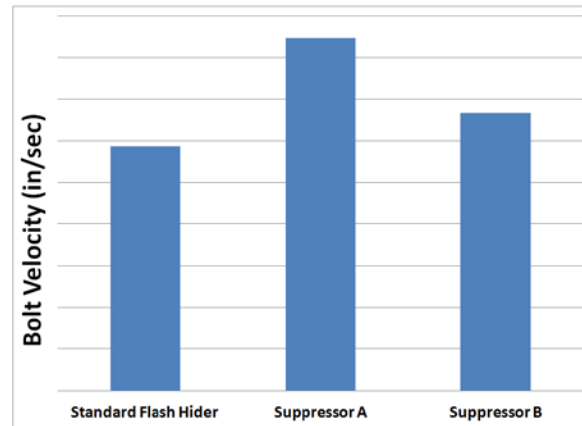
Temp Change



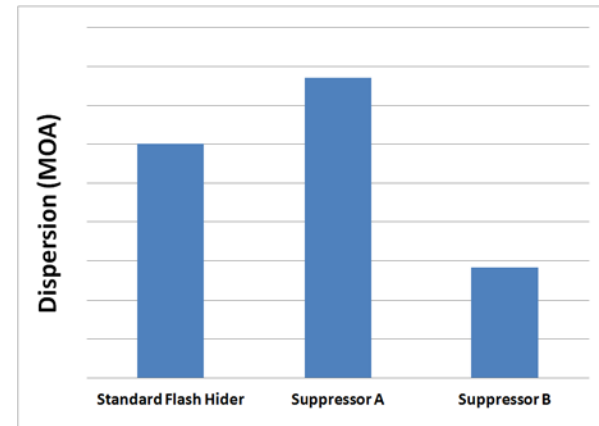
Blowback at Breech



Bolt Velocity



Dispersion



- Six Critical Measurements for Automatic Weapon Suppressors
  - Sound
  - Flash
  - Thermal
  - Blowback
  - Weapon powering
  - Dispersion and POI shift
- System Based Suppressor Design for Automatic Weapon Suppressors
  - Trade-off Between
    - Flash and sound
      - Vs.
    - Thermal, blowback and weapon powering
  - Compromise of sound level required to get a functioning automatic weapon