Division SNC Technologies Inc.

SIMUNITION®

NDIA Small Arms Symposium

15 May 2002

TRAINING FOR THE REAL WORLD™

SIMUNITION® Reduced Energy Cartridges

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SIMUNITION® Product Manager

SIMUNITION® Reduced Energy Cartridges

National Defense Industrial Association & TACOM-ARDEC
2002 International Infantry & Joint Services
Small Arms Symposium

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SNC TEC Profile

- **SIMUNITION® is a business unit of SNC TEC, dedicated to Non-Toxic Training ammunition**

- **SNC TEC is Canada's primary ammunition manufacturer:**
  - Making defence products for over 100 years
  - Revenues forecast in 2002: $ 275 million
  - Employees in 2002: 1,200
  - Registered ISO 9001 - 2000 version
  - Canadian Centre of Excellence for Ammunition Technology

TRAINING FOR THE REAL WORLD™

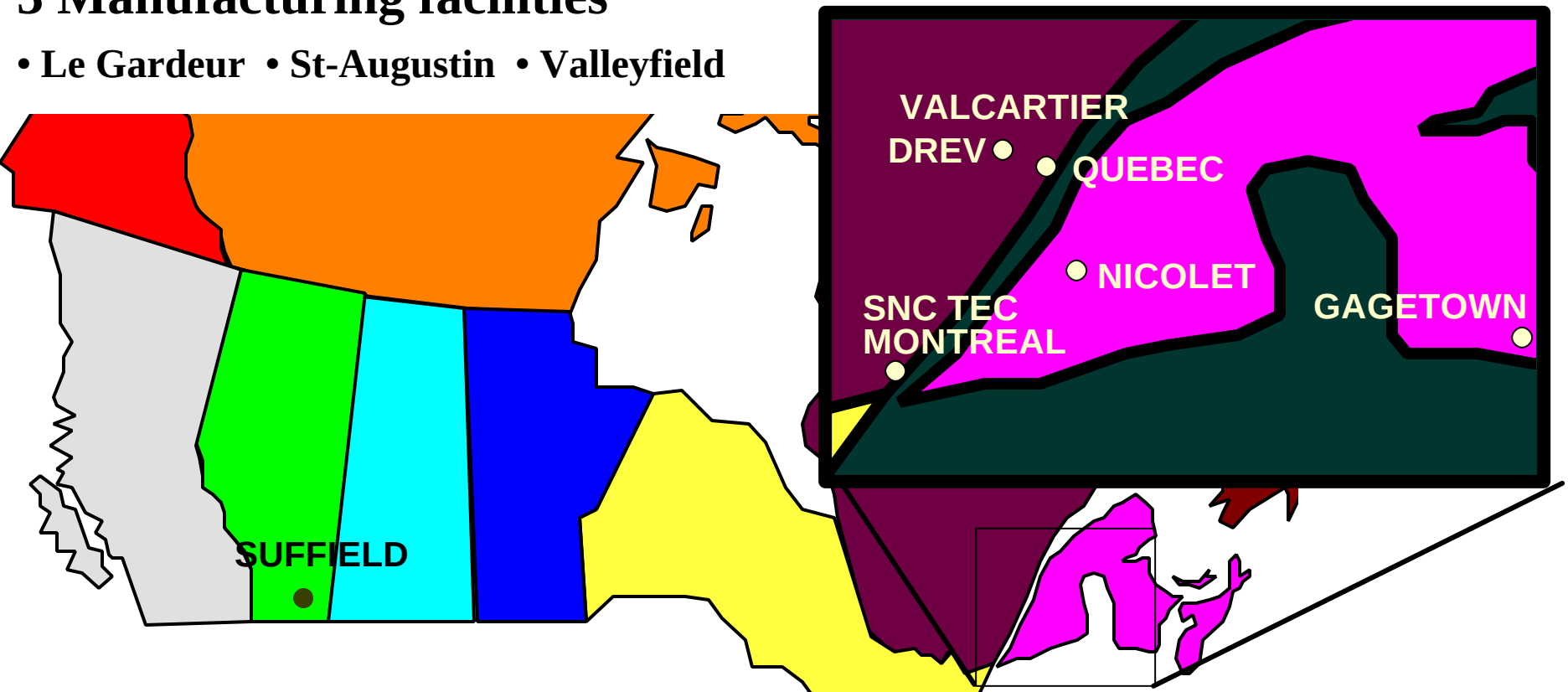
SNC TEC Facilities

- **SNC TEC has 3 manufacturing and several test facilities:**
  - LAP operations, primers at Le Gardeur, near Montréal, QC
  - Brass cases & inert components at St-Augustin, near Québec
  - Propellant manufacturing plant EXPRO TEC at Valleyfield, QC
  - Canadian DND Proof range operated as a GOCO at Nicolet, QC
  - US Headquarters at Avon, CT
  - Sales offices in Brussels, Asia and the Mid-East
- **SNC TEC is accredited as the NATO test center in Canada**

SNC TEC Plants and Test Sites

3 Manufacturing facilities

- Le Gardeur
- St-Augustin
- Valleyfield



Access to DND test facilities:

- METC Nicolet
- DREV Valcartier
- CFB Gagetown
- CFB Suffield

SNC TEC

SNC TEC US Headquarters

- **SNC TEC Corp. in Avon, Connecticut**
- **Opened in 1996**
  - Co-Located with SIMUNITION® USA office
  - Contact for SIMUNITION® DOD inquiries:
  - Mr. Ruben Regalado, US Business Manager
    - E-mail: regalar@pcnet.com
    - Telephone: 860-404-0162

SIMUNITION® Reduced Energy Cartridges

TRAINING FOR THE REAL WORLD™

SIMUNITION® Reduced Energy Cartridges

- In 1990 SIMUNITION® developed a new caliber of training ammunition:
  - The "9mm FX® Marking Cartridge"
    - FX® is a telescoping cartridge with sabot & sub-caliber projectile
    - Projectile filled with inert, water-soluble marking compound
    - Reduced energy for realistic, non-lethal interactive training

FX® Marking Cartridges

- **FX® Background:**
  - FX® sold to Law Enforcement & Special Forces for many years
  - More than 100 Million FX® sold to date
  - In service in over 40 countries around the world
  - SIMUNITION® holds numerous patents for these products
  - FX® currently available in 9mm and .38 cal

FX® Marking Cartridges

- **FX® Features & Benefits:**
  - Excellent tool for MOUT mission rehearsal
  - Realistic interactive scenarios possible without causing harm
  - Reduce high-risk behavior through impact penalty
  - Accurate assessment of lethality through clear hit placement
  - Safer & cleaner than using Blanks with BFA
  - SIMUNITION® converted weapons cannot fire lethal ammo
  - Training with the user's actual weapon w/o adding weight
  - Compatible with LASER-activated battle simulators (MILES)

FX® Marking Cartridges

- **FX® Marking Cartridges:**

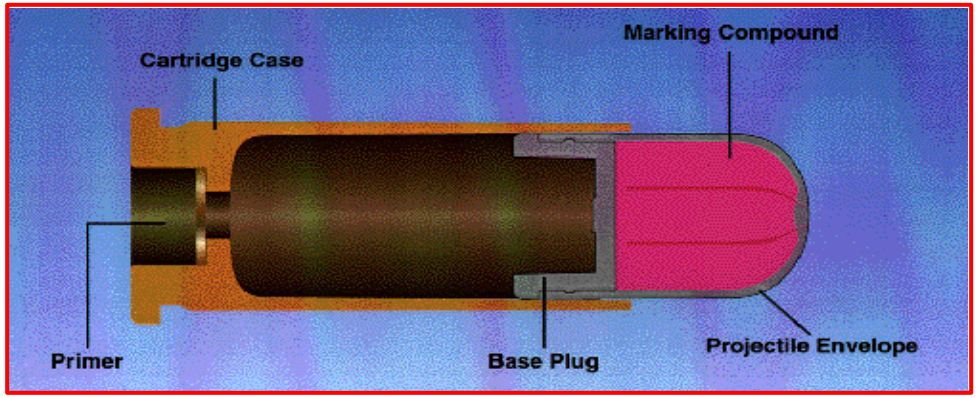
SIMUNITION® Reduced Energy Cartridges

- **SIMUNITION® Philosophy for FX® Marking Cartridges:**
  - 1. Produce safe, realistic Interactive Ammunition
  - 2. Design safe, reliable Weapon Conversions
  - 3. Provide safe, qualified Protective Equipment
  - 4. Offer safe, effective Training Courses

FX® Marking Cartridges

- **SIMUNITION® .38 cal FX®:**

FX® for Revolvers

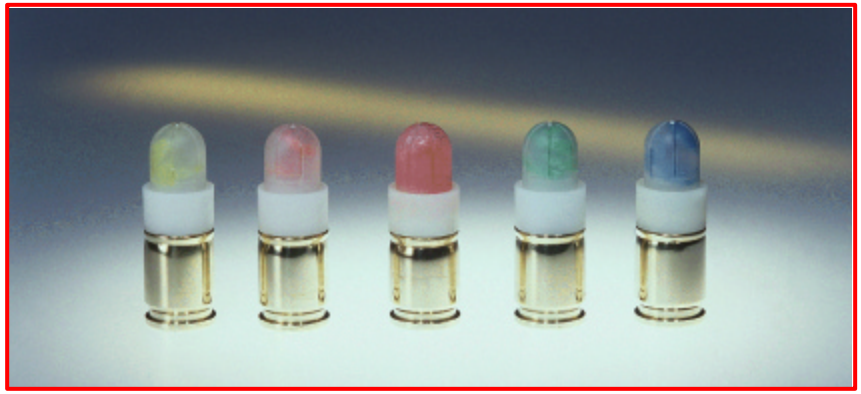


FX® for Shotguns - Less Lethal Scenario training:

Ballistic match to tactical distances

SIMUNITION® Reduced Energy Cartridges

➢ SIMUNITION® 9mm FX® for Assault Rifles/Carbines:



5 colors of 9mm FX® now available

Yellow, Orange, Red, Green and Blue

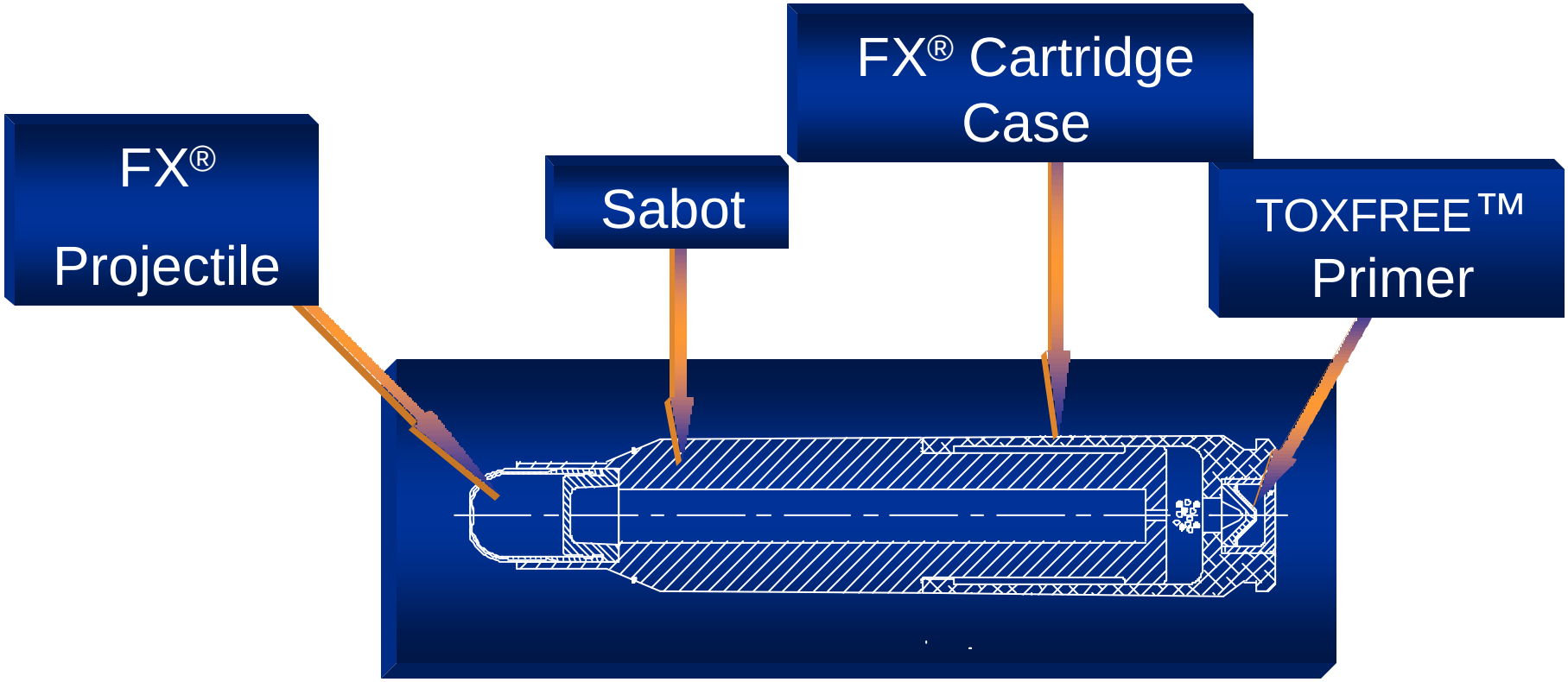
Complete Upper Receiver FX® conversions for M16/M4 family.

Safe FX® Clear plastic magazine provided.

New SIMUNITION® Reduced Energy Cartridge

- **SIMUNITION® Design Objectives for a new caliber: 5.56mm**
  - Develop FX® for the M4/M16, M249 and other assault rifles
  - Design safe drop-in bolt conversion
  - Complete industrialization of a 10-year old concept
  - Complimentary to 9mm FX® for M4/M16 upper receiver kit
  - Introduce the new TOXFREE™ (non-toxic) small rifle primer

New 5.56mm FX® Marking Cartridge



5.56mm FX® Marking Cartridge Components

5.56mm Marking Cartridge

- **SIMUNITION® 5.56mm FX®**
- **Projectile**
  - Plastic shell containing washable color marking compound
- **Cartridge Case**
  - IVI Brass with modified FX® geometry for safety
- **Primer**
  - TOXFREE™ (lead & heavy-metal free) small rifle primer
- **Propellant**
  - Double base smokeless propellant

5.56mm FX® Perfomance Specifications

- **5.56mm FX® Ballistic Performance**
- **Accuracy at 10m**
  - 15cm max Extreme Spread
- **Accuracy at 30m**
  - Impact Silhouette targets without adjusting sights
- **Ballistic match at 30m**
  - MPI within ± 30 cm of NATO ball round

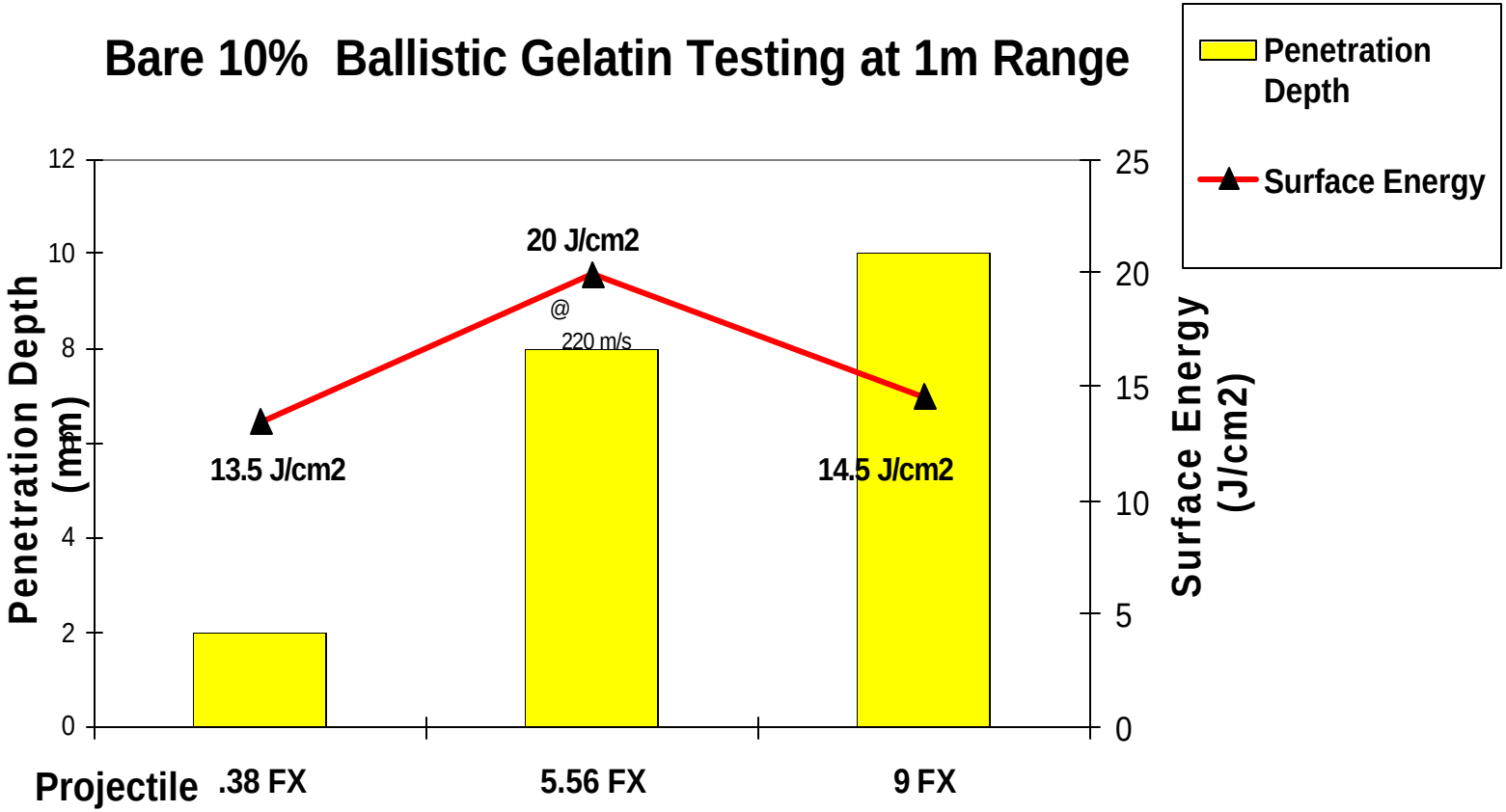
5.56mm FX® Performance Specifications

- **EPVAT at +21° C**
- **Muzzle Velocity**
  - 200 ± 20 m/s (depending on weapon)
- **Chamber Pressure**
  - ≤ 20 MPa (~3,000 PSI)
- **Functioning**
  - Normal function in full automatic, burst or single shot modes

5.56mm FX® Terminal Effects

- **Similar Terminal Ballistics to 9mm FX®**
- **No penetration of 20% bare gelatin**
  - Impossible to measure terminal effects in 20% gelatin
- **Comparison testing in 5% and 10% gelatin**
  - No penetration of gelatin protected by a single layer of clothing
  - Bare gelatin required to obtain measurements
  - 5% gelatin too soft to differentiate penetration depth
  - 9mm FX® had deeper penetration than 5.56mm FX® in 10%

5.56mm FX® Terminal Effects



5.56mm FX® Terminal Effects

➢ Comparison of Muzzle Velocity & Energy

– 3 different calibers of FX® Marking Cartridges:

	Velocity m/s	Muzzle Energy Joules	Surface Energy J/cm
.38 mm FX®	160	8.5	13.5
9 mm FX®	165	6.5	14.5
5.56 mm FX®	220	5.0	20.0

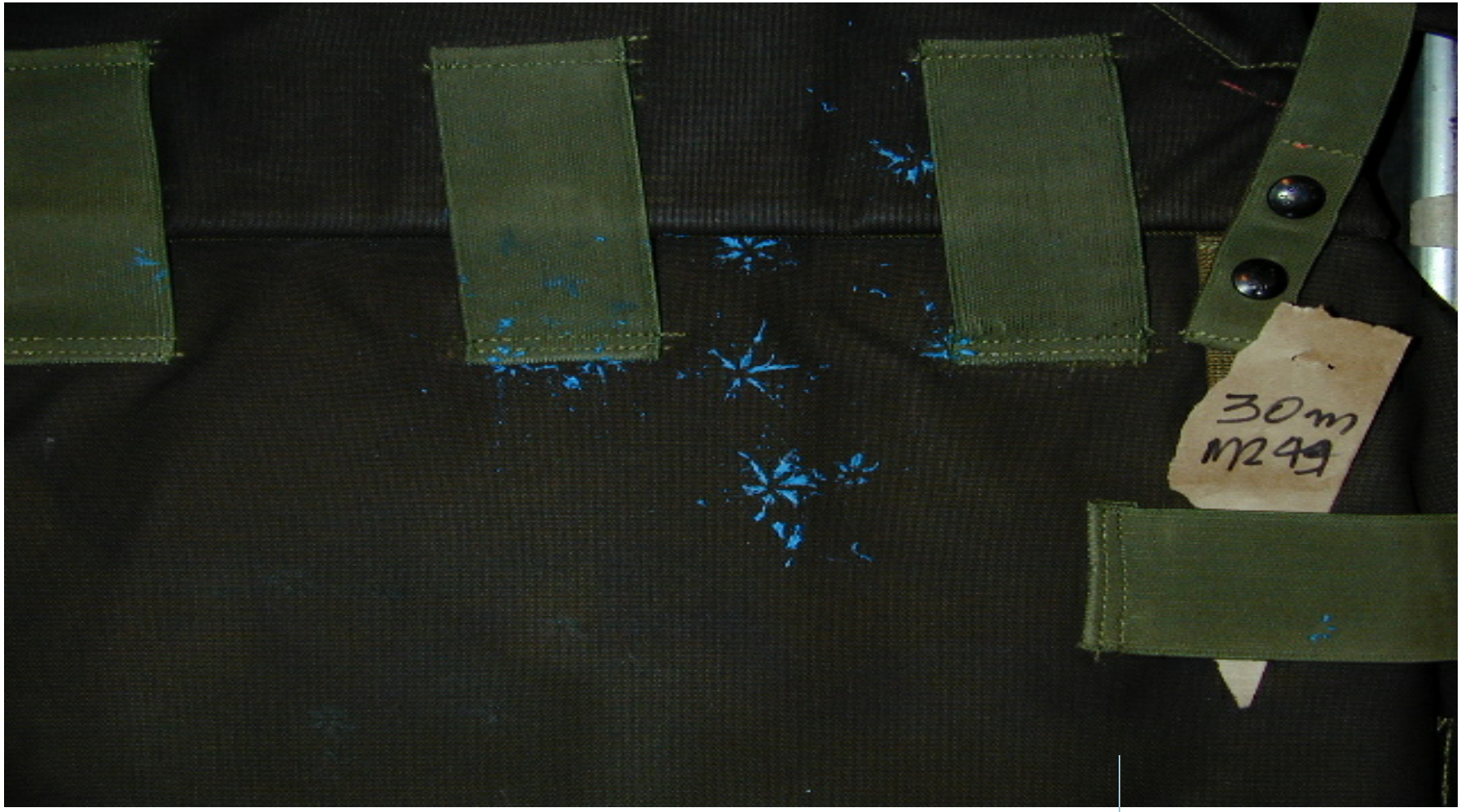
- .38 cal FX® has the largest muzzle kinetic energy
- 9mm FX® has the deepest penetration in 10% gelatin
- 5.56mm FX® has the highest surface energy level

5.56mm FX® Terminal Effects

➢ Comparison of Impact Penalty

- Performed on SIMUNITION® “volunteers”
- 9mm FX® vs 5.56mm FX®
- Tested at 5m range
- Subjects protected by BDU-type clothing
- Similar impact penalty in 5.56mm and 9mm FX®
- Impossible to distinguish between calibers

5.56mm FX® Marking on Flak Jacket



5.56mm FX® Marking on Lexan target

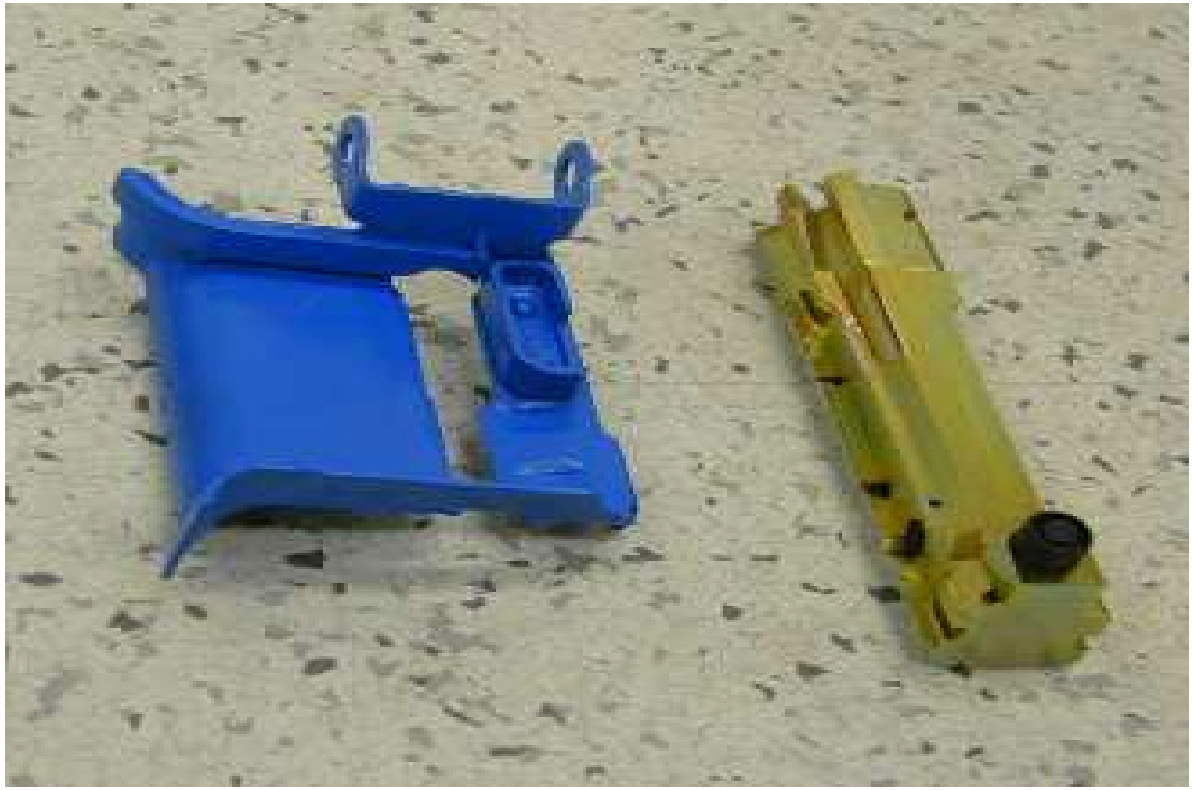
5.56mm FX® Bolt Conversions

- **Conversion bolts for 5.56mm weapons:**
  - M4 carbines, M16 rifles, M249 SAW & FN MIMIMI
  - Conversion bolt and SIMUNITION® BLUE™ feed tray:
    - Converts weapon to straight blow-back
    - Visibly distinguishable from service bolt
    - Live fire exclusion features built into bolts for safety to users

5.56mm FX® bolt for M4/M16

User Installed & maintained, no tools required, bolt change only

FX® Conversion kit for M249 Machine gun



SIMUNITION® BLUE™ feed tray
& conversion bolt - with safety features built-in

5.56mm FX® Marking Cartridges

- **Available in 5 Colors:**
  - Florescent Red, Blue, Green, Orange, Yellow
  - Sealed projectile ensures bullet integrity in bore
  - Projectile design ensures excellent marking on target
  - Linked or clipped

5.56mm FX® Marking Cartridges

- **Linked for machine guns :M249, MINIMI**

SIMUNITION® Marking Cartridges

- **The complete family:**
  - 9mm FX®
  - .38 cal FX®
  - 5.56mm FX®

SIMUNITION® 5.56mm FX® Marking Cartridges

- **SUMMARY**
  - **The new 5.56mm FX®:**
    - Is a new caliber for SIMUNITION®
    - Functions the M4/M16 and M249
      - Only drop-in safe bolt conversion required
    - Is completely non-toxic and non-lethal
    - Is an addition to the 9mm FX® for M4/M16 & M9, M11 kits
    - Design leverages past performance of 9mm FX®
  - **The Solution for**: CLOSE COMBAT MISSION CAPABILITY KIT