Always a Step Ahead

ARDEC

ARMAMENTS

Sub-Miniature Laser Igniters

Presented to:

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UNPARALLELED

COMMITMENT

& SOLUTIONS

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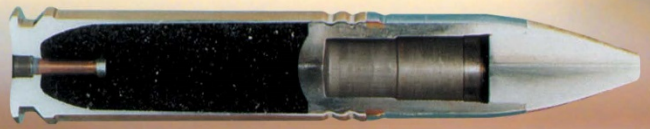
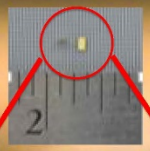
Sub-Miniature Laser Igniters

OBJECTIVE: REPLACE ELECTRIC IGNITERS WITH ELECTRO-OPTICAL IGNITERS



Seamlessly interchangeable with current electrical primer based weapons and cartridges

COTS LASER DIODE



ARDEC Design

✓ GOVERNMENT & COMMERCIAL DESIGNS

Commercial Sources Being Pursued

✓ Gun Firing Demonstrated

✓ Passed HERO and PESD Testing

6 New Gov't Patent Applications in the last 12 months

Potential commercial applications include automotive airbags, civilian mining, demolitions, smart ammo and fireworks.

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TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

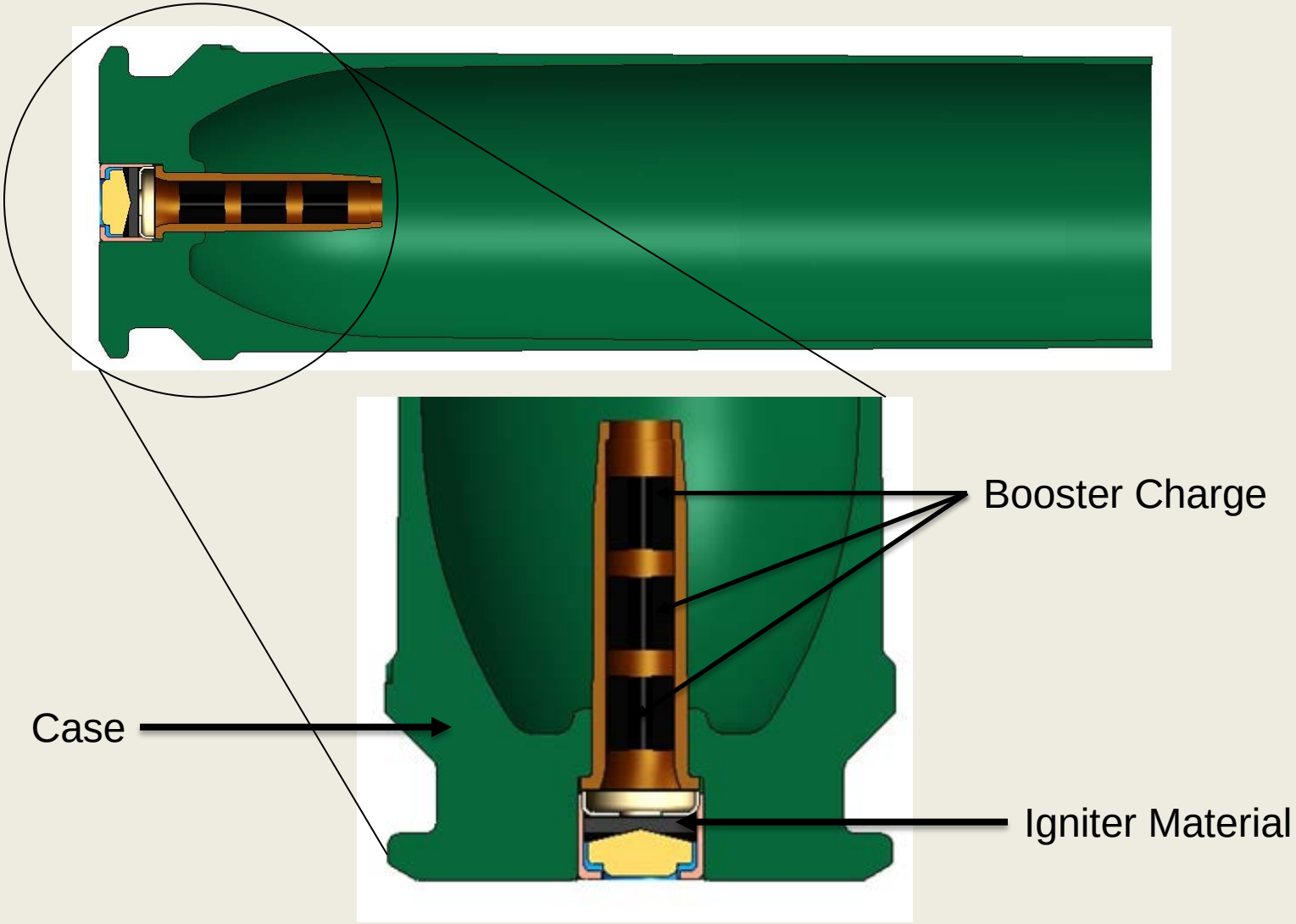
SUMMARY OF THE PROBLEM

- **Electrically fired ignition devices are inherently susceptible to some form of inadvertent ignition, i.e. RF, ESD, etc.**
- **There are current and future concerns relative to Electromagnetic Environmental Effects (E^3) and energetic devices.**
- **Firing circuits on existing systems are designed for resistive heating ignition (relatively low electrical power)**

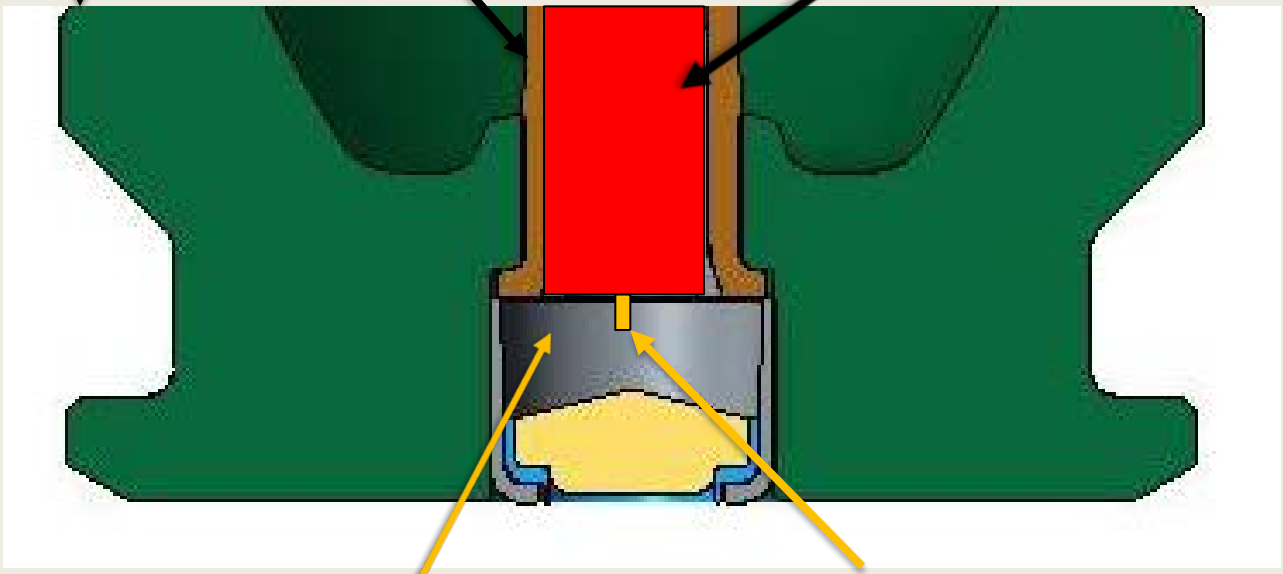
SUMMARY OF THE TECHNOLOGY

- **Remove/isolate electrically sensitive ignition materials from all electrical stimuli (designed or secondary)**
- **Utilize a Commercial-Off-The-Shelf (COTS) laser diode to initiate the ignition materials**
- **Place electrical assembly (to include the laser diode) in the current igniter volume to protect against inadvertent electrical ignition**
- **Utilize the remainder of the existing ignition system to complete the firing of the system**

ELECTRICAL IGNITION EXAMPLE

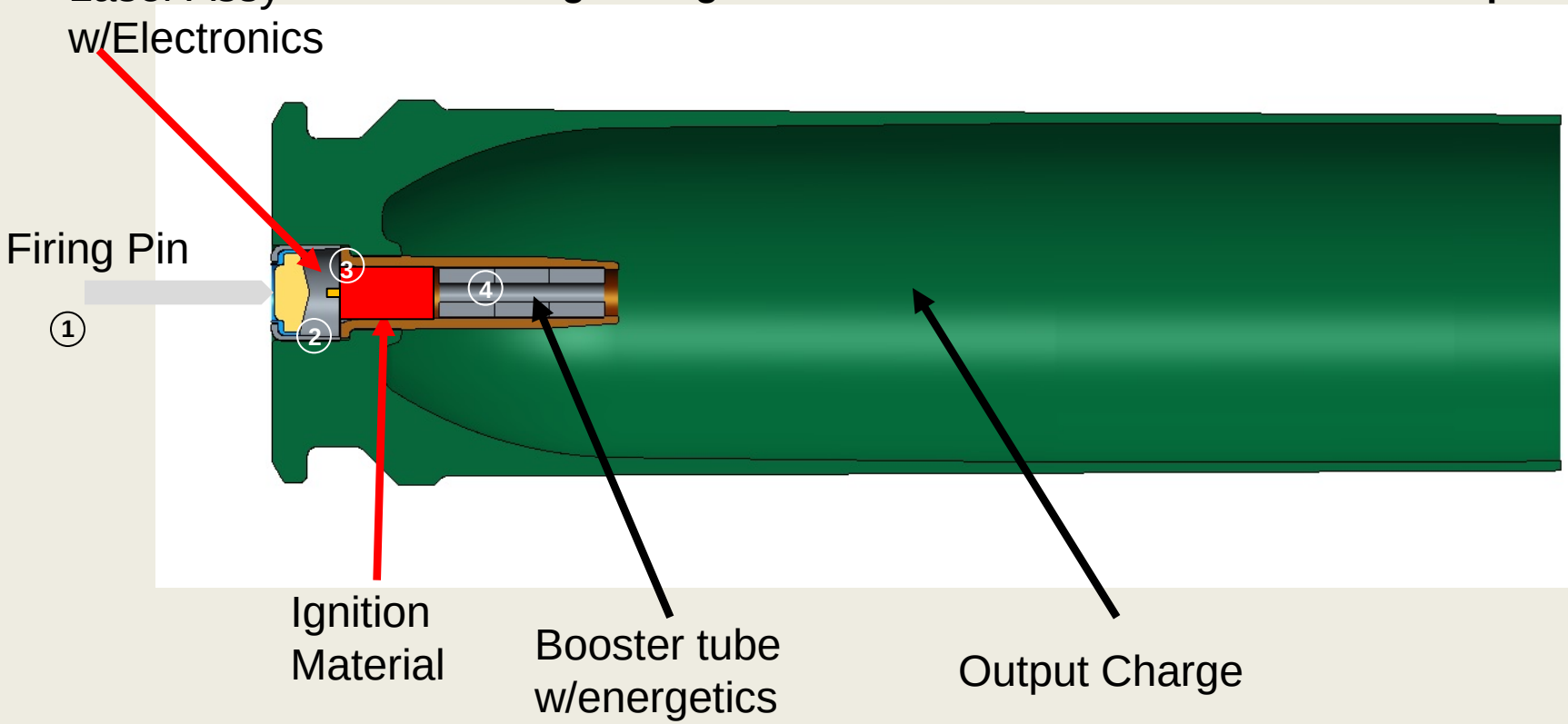


SUB-MINIATURE ELECTRICAL IGNITER



TYPICAL FIRING SEQUENCE

1. Standard electrical firing pulse delivered from firing pin
2. Sufficient amperage delivered to activate laser diode
3. Laser diode fires laser beam across small gap to energetics
4. Energetics ignite and function the remainder of the output charge



Status:

- Initial prototype component fixture for HERO & ESD testing designed and assembled
- RF exposure of individual components mounted within the test case successfully completed with diode functionality confirmed and no output from the diode during stimulation
- ESD exposure of laser diode mounted within the test case successfully completed with diode functionality confirmed
- Diodes with “unprotected” electronics have been successfully test fired as bare devices and assembled within the existing igniter cup volume
- Ignition train (laser diode ➡ ignition material ➡ energetics pellets) has been successfully tested
- U.S. Patent issued for basic technology
- Electronic design and assembly process compatible with high speed manufacturing nearing completion