



Non-Incendiary Illumination Applications For Ammunition



Guns & Missiles
Conference

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 **CYALUME**[®]
Light Technology

GENERAL DYNAMICS
Ordnance and Tactical Systems

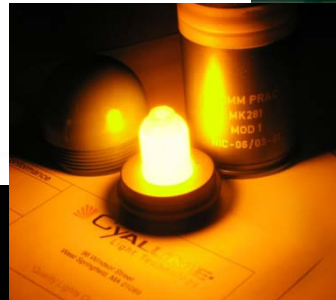
Overview

- GD-OTS and Cyalume Technologies are introducing several distinct low-cost projectiles that will help utilize USG existing excess hardware and offer new technologies in low-level (overt and covert) illumination and marking capabilities for artillery and mortar systems.
- Each yield non-incendiary solutions that would be inherently inert, environmentally safe, and user-friendly.



Existing Products

- MK 281 Mod 0 / 1 40mm Trainer
- 40mm High Velocity (Rheinmetall Prime Contractor)
- Day and Night Marker
- Produced Since 2006





40mm High Velocity Mark 281



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Why Non-Incendiary?

- With current suites of marker and illuminating ammunition the warfighter is at the risk of initiating unwanted fires in non-combatant areas
- Non-Incendiary offers lower costs by eliminating hazardous burning materials
- Non-toxic, Green Ammunition



Nonflammable IR – Illumination Applications

- Promoting Green Training and Operational Munition Applications that are non-toxic, nonflammable, non-energetic, non-dud producing and biodegradable
- Integrating Overt (visible) and Covert (IR/Thermal) Chemiluminescent Munitions for mortar and artillery applications
- Integrating non-toxic, nonflammable IR Illumination with extended duration times
- IR Illumination applications for Mortars and Artillery
- Enhanced capabilities and reduced collateral damage in training and noncombatant areas



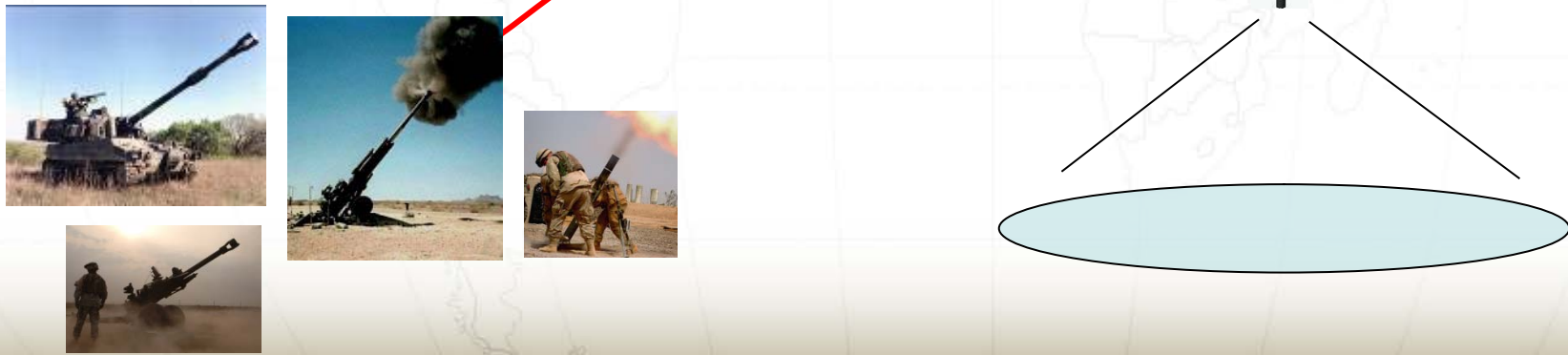
Non-Incendiary IR Illumination Benefits

- Elimination of residual visible light
- Reduce operational collateral damage for noncombatants
- Means to expedite and enhance US Military range cleanup and maintenance
- Integrate an active environmental program to save taxpayer dollars at the requirements level
- Ability to train and qualify supporting amphibious and afloat operations for inland and coastal waterways
- Activate US Government Cost Savings Referral Program



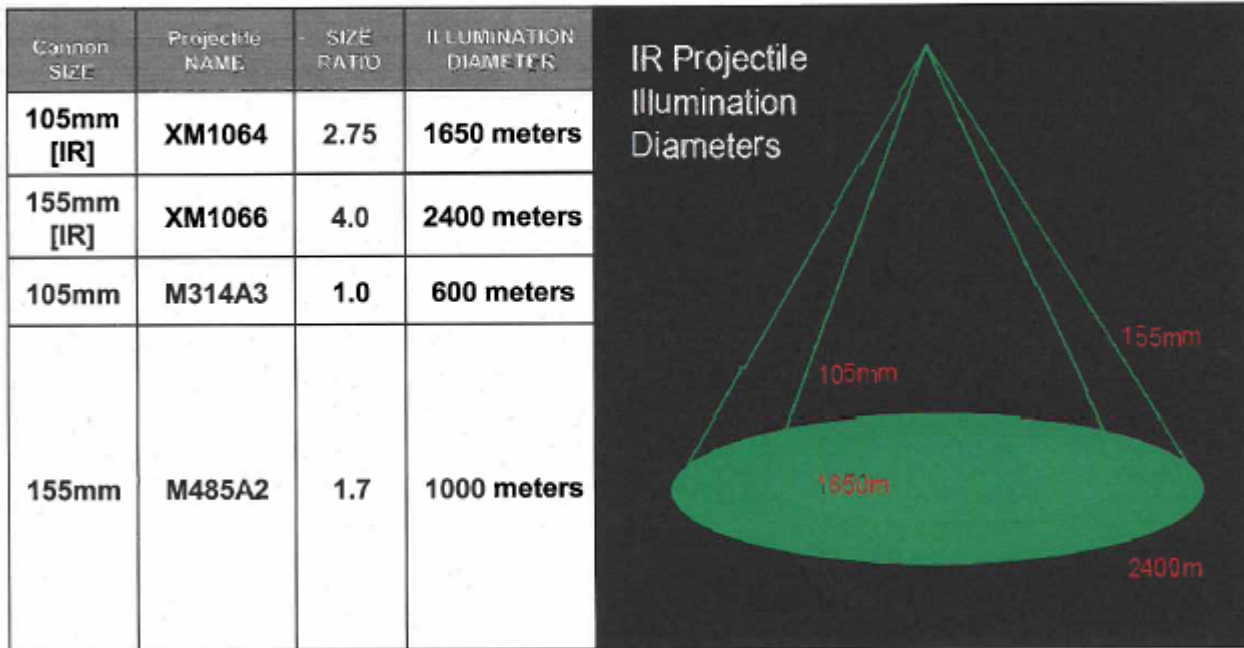
Non-Incendiary IR Illumination

- The replacement of flare-type illuminant payloads with inert chemiluminescent candles that can produce pure IR-spectrum illumination without any residual visible light.
- Applicable to both mortars and artillery as potential illuminants
- Payloads can be tailored to meet mass and physical properties of existing cargo to ensure ballistic similitude



Current Incendiary IR ILLUM Candles

IR Cannon Projectile Illumination Diameters vs. Visible Illumination Diameters at a Height of Illumination of 650-800 meters and a Required Minimum Ground Illumination Intensity of .18 foot-candle.



This family of IR Projectiles can provide infrared illumination ground coverage of about 2.5 times more than standard illuminating Projectiles





Day / Night Marker Simulation



Green Munitions

Cyalume Green/Eco-friendly Technology

- Chemiluminescent technologies are
 - ✓ Non-toxic
 - ✓ Not harmful to the environment
 - ✓ Biodegradable
- Enhance Training and Operational Capabilities
 - ✓ Train 24/7, 365
 - ✓ Train during Wet and Dry Range Periods
 - ✓ Reduce Contamination
 - ✓ Reduce Noncombatant Collateral Damage
- Significantly reduces USG costs for range maintenance and clean-up



Non-incendiary Munitions



- Chemiluminescent Munitions that are
 - ✓ Nonflammable
 - ✓ Non-energetic
 - ✓ Non-Dud Producing
- Enhance training and operational capabilities
 - ✓ Train 24/7, 365
 - ✓ Train during Wet & Dry Range Periods
 - ✓ Enable Combat Maneuver Training
 - ✓ Reduce Noncombatant Collateral Damage
- Significantly reduces USG costs for Range Maintenance, Clean-up and Range Fires



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