Enabling Methods For One Way Luminescent “Cold” Tracers

By:

Howard D. Kent, Armor Development Group, LLC
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Theme: “Correct Aim And Fire Again”

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Introduction:

Public Information Defining Current Tracer Technology:

A tracer projectile is constructed with a hollow base filled with a pyrotechnic flare material, often made of phosphorus or magnesium or other bright burning chemicals. In NATO standard ammunition (including U.S.), this is usually a mixture of strontium compounds (nitrate, peroxide, etc.) and a metal fuel such as magnesium. This yields a bright red light. Russian and Chinese tracer ammunition generates green light using barium salts. Some modern designs use compositions that produce little to no visible light and radiate mainly in infrared, being visible only on night vision equipment.\[5\]

There are three types of tracers: bright tracer, subdued tracer and dim tracer. Bright tracers are the standard type, which start burning immediately after exiting the muzzle. A disadvantage of bright tracers is that they give away the shooter's location to the enemy; as a military adage puts it, "tracers work both ways". Bright tracers can also overwhelm night-vision devices, rendering them useless. Subdued tracers burn at full brightness after a hundred or more yards to avoid giving away the gunner's position. Dim tracers burn very dimly but are clearly visible through night-vision equipment.

Traditional Pyrotechnic Tracer Ammunition Designs:

Tracer Ammunition

Clockwise From Upper Left: Intres.com, Cartridgecollectors.com, Ammo2Go.com, K. Gross Photo.
Traditional Burning Tracer Firing:

Note: Automatic Weapons Fire & Secondary Ignition Fires

Above: Daily Mail UK Tracers.
Highly Visible Firing Signatures & Significant Fire Risk:

Persistent Problems With Current Tracer Technology…

Clockwise From Upper Left: US Army Photo, USMC Photo, Capistrano Dispatch,, Deseret News, The Truth About Guns
Widespread Bans On Firing Tracer Ammunition At Ranges:

Severe Risk Of Public & Private Range Land Wildfires
Commercial Reduced Risk & Non-Flammable Tracing Ammunition:

Clockwise From Upper Left: SBR Ammunition, Fiocci, Glow Ammo, Glow Ammo, G2 Tracer, Inceptor Ammunition
The Goal: Daylight Visible, One Way Luminescent Tracers

Above: Weaponsman.com Photo
ARDEC “OWL” Tracer Base Applique Development:

Above: US Army Photos
Base Ablation Resistance Technique: Fireproof Carbon Burst Discs

Clockwise From Upper Left: Elfab.com, ElmacTechnologies.com, SPIE.org Burst Disc
OWL Visibility Maximizing Technique: Glass “Cabocho n” Lensing

Clockwise From Upper Left: HDKent 2015, CNET Photo, HDKent 2015, David Darling Info Graphic
Light – To - Light

Using The Light Of Powder Ignition To Activate OWL Tracer
Burning Gunpowder Produces IR, Visible & UV Light:

Which May Then Be Used To Activate Phosphorescent Materials…

Clockwise From Upper Left:: Ammo Tests WW2 Powder (2), Hodgdon Gunpowder, RedOrbit.com Graphic.
Heat – To - Light

Using The Heat Of Powder Ignition To Activate OWL Tracer
Weapon Firing Heat As OWL Activation Mechanism:

Combustion + Pressure = High Enough Temperature To Glow Visibly…

Clockwise From Upper Left: HDKent 2013 (2), SureFire Photo, AR-15.com Photo, Bottershoot Photo.
Heat And Not Electricity Actually Causes Lightbulbs To Glow:

How Does A Lightbulb Work?

An incandescent bulb uses heat caused by an electrical current. When electrical current passes through a wire, it causes the wire to heat. The wire, or filament, *gets so hot that it glows and gives off* light

Everyday incandescent light bulbs have a filament made of *Tungsten*.

Jun 17, 1992; [www.pa.msu.edu/sciencet/ask_st/061792.html](http://www.pa.msu.edu/sciencet/ask_st/061792.html)
Michigan State University
Tungsten Nanowires Behave As Incandescent Bulb Filaments:

Tiny Filament Wire Structure Heats Instantly Using Powder Ignition Heat…

Clockwise From Upper Left: 1000Bulbs.com, Shutterstock.com, NISE Ordered Nanowires, Intechopen.com Tungsten Nanowires.
Pressure – To – Light

Using The Pressure Of Powder Ignition To Activate OWL Tracer
Examples Of Pressure Waves Generated By Weapon Firing:

Clockwise From Upper Left: Shooting Times Photo, US Army Photo, Here Kuulaapa Photo.
Pressure Sensitive Paint & Cabochon OWL Technique:

Energized By Combustion UV & Activated By Chamber Pressure…

Piezo-Electrically Energized OLED Derived OWL Method:

Bending Piezo-Electric Material Substrate Illuminates Bright OLED…

Clockwise From Upper Left: Intres.com, Cartridgecollectors.com, Ammo2Go, K. Gross Photo
Guest Speaker:
PNW Arms
One Way Luminescence
Existing Technology
Future of Program

OWL
Executive Summary

OWL is a non-exothermic substance developed from bioluminescence research that transfers the energy from the explosion of the round in your chamber to the trajectory of the bullet in flight. Applied the base of every bullet, OWL establishes instant visual feedback on a per round basis in low/no light conditions without compromising the shooters location. This enables a shooter to focus on round placement during engagements and instantly produce targeting correction. As it can only be seen from the shooters perspective, OWL is utterly undetectable from the impact zone to follow.
CONFIDENTIAL:

(Subject Of Potential Contractor Proposed Daylight Visible OWL Trace CRADA)
Fred Newcome

(PNW Arms Vice President of Sales & Former Force Recon Marine)
Recommendations:

1) Incorporate Industrial Ablation Protection To Preserve OWL Tracers
2) Take Advantage Of The Light, Heat & Pressure Present For Initiation
3) Pursue Bullet Base “Cabochoon” Glass Optics To Increase Visibility
4) Prepare For “SWAP” Advances In OLEDs & Photoluminescence
5) Use Commercial Ammunition Offerings To Leverage DoD Research
Conclusions:

1) One Way Luminescent Tracers Can “Burn” Longer & Brighter Through Incorporating The Previous Recommendations.


3) Both Long Range Marksmanship Trajectory/Wind Readings & Short Range Training Will Be Improved By Direct Feedback.

4) Low Cost Tracing Elements May Allow All DoD Rounds To Be Tracers.
Credits:

POC: Howard D. Kent, CEO, Phone: 818-314-8636, e-Mail: HDKent@socal.rr.com

With Special Thanks To:

POC: Fred Newcome, VP Sales PNW Arms, Phone: (208) 875-2331 x306, Fred.Newcome@PNWArms.com

And:

Joel M. Goldman, Director
JSSAP
US Army ARDEC, Picatinny