

# **GENERAL DYNAMICS**

Ordnance and Tactical Systems

**IR Dim Trace For Ammunition**

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**By**

**Guy Henry III**

# IR-DIM Trace for Ammunition

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## Introduction

We will present a new pyrotechnic which upon combustion produces a signature of infrared radiation. It was developed as a tracer for medium caliber ammunition and allows the gunner with night vision to follow trajectories without disclosing position. The tracer composition is also slow burning making it well suited to long time of flight applications.

# IR-DIM Trace for Ammunition

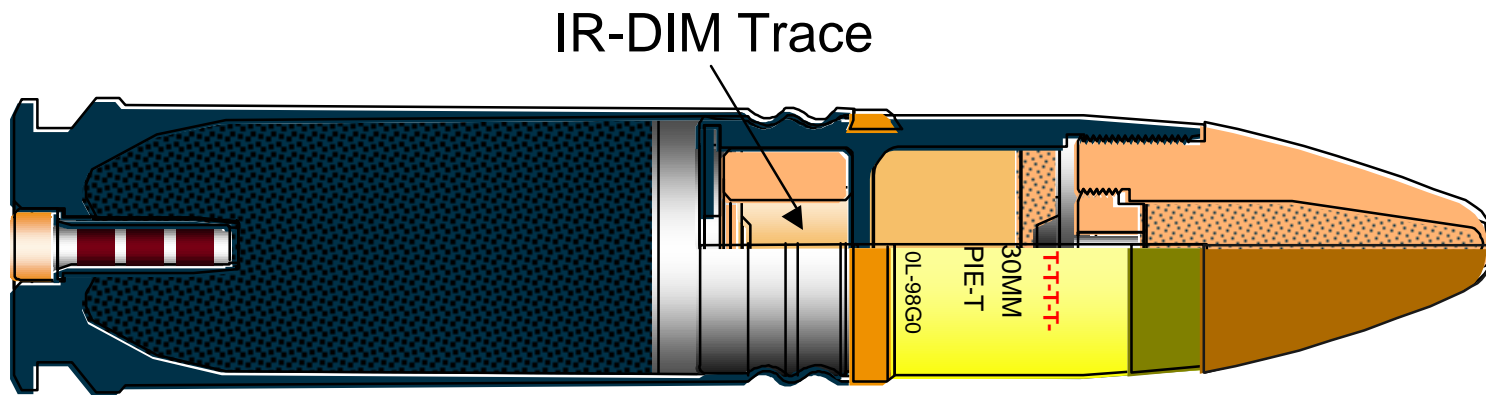
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## History

- 1/96      Contacted by customer about developing a 30 X 113mm IR-DIM traced cartridge.
- 2/96      Proposed a 30mm X 113mm PIE-T Cartridge (Pyrotechnically Initiated Explosive-Traced). The trace being IR-DIM trace.
- 5/96      Awarded contract to develop cartridge and deliver 90,000 cartridges (DAAD05-96-C-9016).
- 6/97      Successful demonstration of IR-DIM Trace and Igniter
- 2/00      Delivered Cartridges

# IR-DIM Trace for Ammunition

## 30mm PIE-T Cartridge



# IR-DIM Trace for Ammunition

Two initial formulations evaluated in 30mm.

DLQ202 Thiokol supplied proprietary formulation.

R-440 IR-DIM trace for .50 caliber projectile

Barium Peroxide	40%
Strontium Peroxide	40%
Calcium Resinate	10%
Magnesium Carbonate	10%

## 30mm X 113 Trace Burn Time Requirement

Burn time: The projectile shall exhibit an average trace thru the ADVIS-6 night vision equipment for a minimum of 7.0 seconds at -25°F and 140 °F. No visible trace

Accept & Reject: One hundred and ten (110) cartridges will be tested at each temperature. Failure of six (6) or less cartridges to meet trace burn time will result in acceptance. Seven (7) to eleven (11) failures will require a full re-test at that temperature. Twelve (12) or more failures fail the lot.

# IR-DIM Trace for Ammunition

	<i>Temperature (F °)</i>	<i>Trace Burn Time 20 Rounds(s)</i>	<i>Blinds</i>
<b>DLW202</b>	140	1.62	0
	-25	3.35	0
<b>R-440</b>	140	5.47	5
	-25	4.72	8

- **These formulations did not meet the minimum requirements.**
- **Initiated a program of modifying R-440 for longer burn-time and ignitability.**

# IR-DIM Trace for Ammunition

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## Igniter

- Choose IR-DIM Igniter developed at Picatinny Arsenal by Tom Doris.

Polyurthane	9%
Strontium Peroxide	91%

## Trace

To increase the burn-time and reliability of burn, a small amount of metal fuel and a different oxidizer were added to the R-440 formulation.

# IR-DIM Trace for Ammunition

<u>Ingredient</u>	<u>%</u>
Strontium Peroxide	34.5
Barium Peroxide	34.5
Magnesium Carbonate	10.0
Calcium Resinate	10.0
Silicon 99.9% Metals Basis	1.0
Barium Nitrate	10.0



# IR-DIM Trace for Ammunition

	<i>Temperature (F °)</i>	<i>Trace Burn Time 20 Rounds(s)</i>	<i>Blinds</i>
<b>DLW202</b>	140	1.62	0
	-25	3.35	0
<b>R-440</b>	140	5.47	5
	-25	4.72	8
<b>IR-DIM Trace</b>	<b>140</b>	<b>8.34</b>	<b>0</b>
	<b>-25</b>	<b>11.18</b>	<b>0</b>

# IR-DIM Trace for Ammunition

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**General Dynamics-OTS brings to the Medium Caliber Ammunition market a superior qualified IR-Dim trace.**

Product application information inquiries may be directed to:

James Stallard

Director of Marketing

727-578-8115

[jestallard@stp.gd-ots.com](mailto:jestallard@stp.gd-ots.com)