



New Developments in Tracer Ammunition for Night Combat

Nammo Small Arms Ammunition Division

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Nordic Ammunition Company

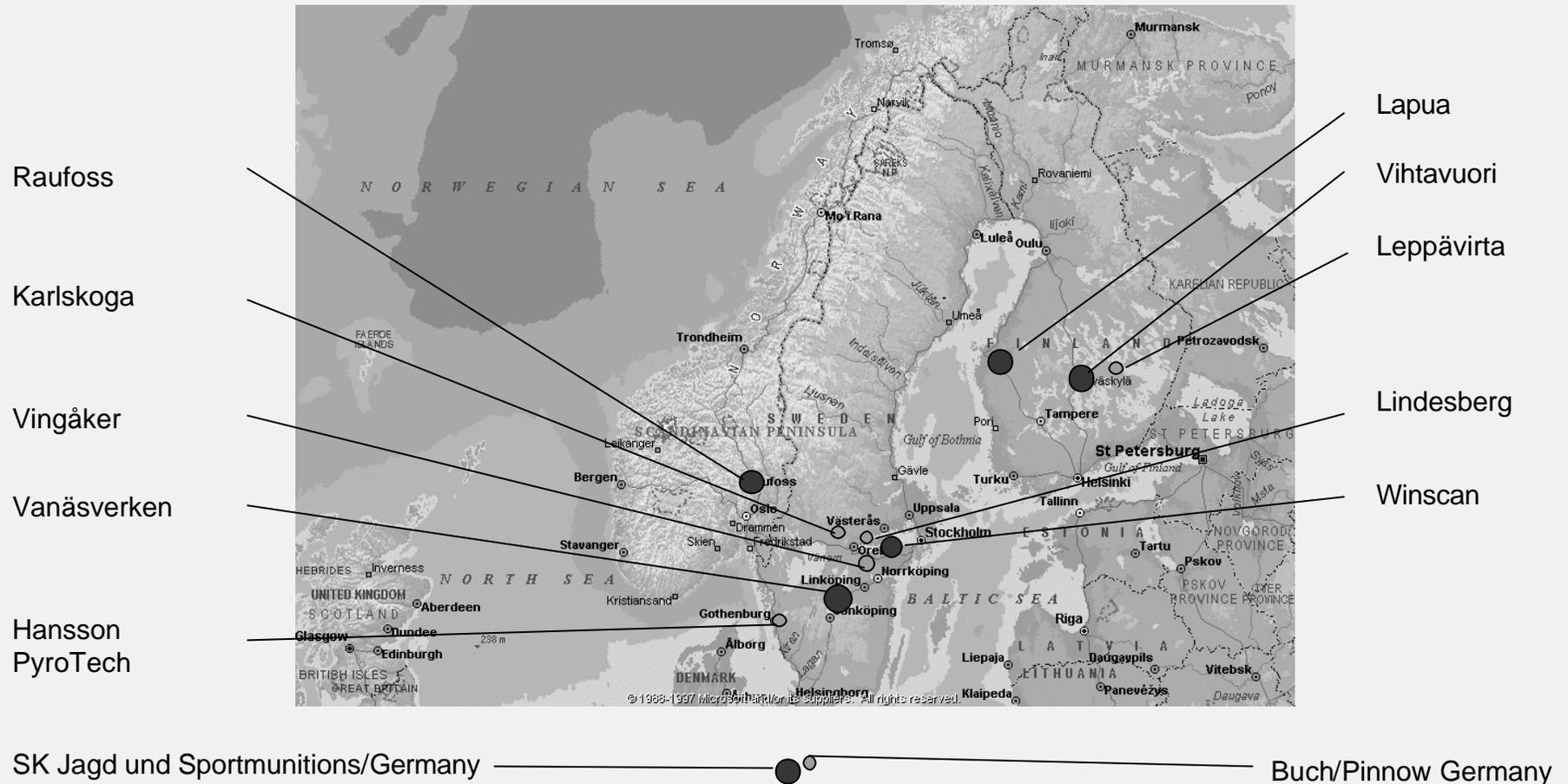
- **Located in Finland, Norway, Sweden and Germany**
- **Established 1998 by Raufoss, Celsius and Patria**
- **Turnover 1,400 mill. NOK. (mill. US\$ 185)**
- **Employees 1,500**
- **Main Product Areas :**
 - **Small Arms Ammunition**
 - **Medium Calibre Ammunition**
 - **Components**
 - **Revision, Demil & Pyrotechnical products (RDP)**
 - **Propulsion**

Business Areas

- **Military & Law enforcement**
 - The factories in Lapua, Vanäsverken and Raufoss have a long tradition as suppliers to the Military Forces and Law Enforcement authorities. The product range reaches from 5.56 mm to .338 Lapua Magnum and 9 mm (Hand guns) and includes Ball as well as Tracer, Armour Piercing, Blank and Training Ammunition.
- **Civilian Centerfire**
 - Our well established position for ammunition used by the world's leading competition shooters is undergoing continuous development. The wide spectre of products includes 6 mm, 6.5 x 55 mm, 7.62, .308 and 9 mm cartridges. For hunters the Lapua name is also well known as one of the leading producers in the world.
- **Rimfire**
 - For rimfire ammunition a leading position has been achieved through repeated success in competitions around the world. Through the brands Lapua and Sk a wide range of products are offered.



Locations



Military SAA Product Development

- **Non-Toxic ammunition with improved performance**
- **AP-ammunition**
- **Sniper ammunition (Ball/AP/API)**
- **Tracer ammunition**



Night Combat – Main Issues

- **Opening of fire – Surprise effect**
- **Target location – Also after opening of fire**
- **Minimal disturbance – Own observers**
- **Minimal exposure – Own unit:**
 - **No tracer visibility for naked eye**
 - **Reduce muzzle flash**
 - **Minimal illumination of own unit**
 - **Minimal sound**

Conventional Tracer Problems - Examples

- **Helicopters:**
Long ranges - Target Acquisition (High rate of fire)

- **Water crafts:**
Long ranges - Reflections, Illumination of own craft

- **Individual soldier:**
Short distance - Target location & engagement

Conventional Tracer Disadvantages

- **Target location after opening of fire**

Lower Hit Probability!

- **Illumination backwards**
- **Muzzle flash**
- **Tracer tracking by enemy**

Exposure of own unit!

Conclusion

- **For future night combat the conventional tracer must be replaced/complemented with a tracer cartridge with the following characteristics:**
 - **Not visible for the human eye**
 - **Visible with image intensifiers**
 - **Minimal muzzle flash**

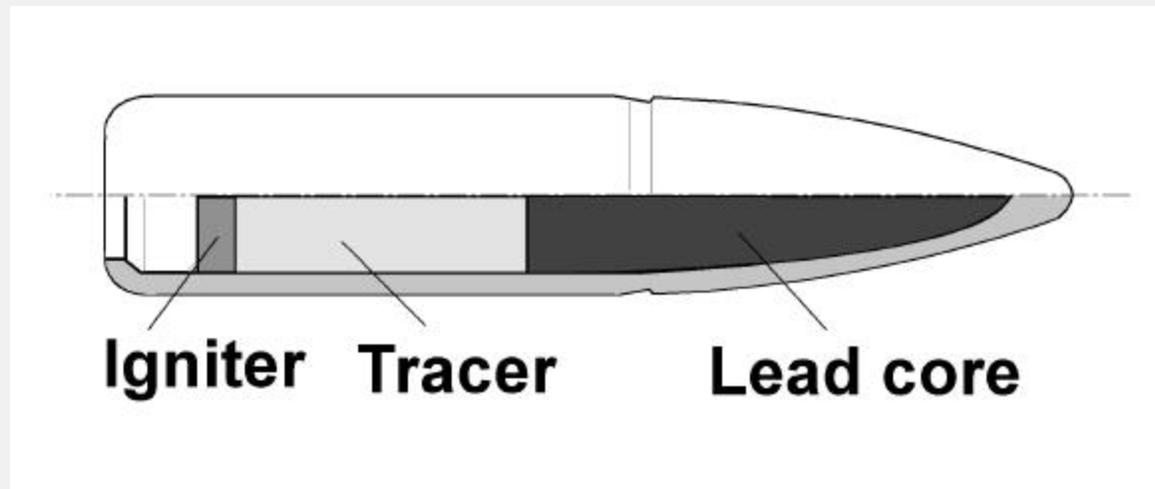
The solution - A Dim Tracer

SAAD Dim Tracer Properties

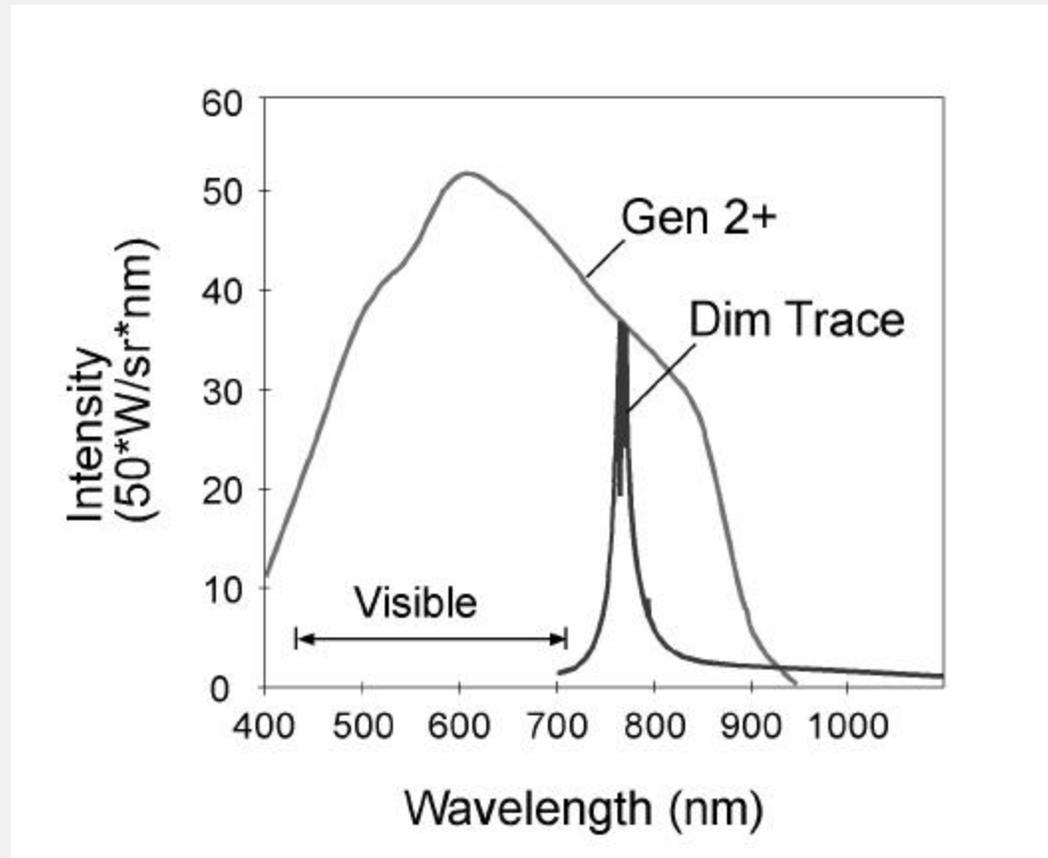
- **General cartridge requirements based on STANAG 4172 for 5.56 mm and 2310 for 7.62 mm**
- **Minimal emission in visible spectrum**
- **Main emission in close to visible IR with wavelength 0.7-0.8 μ m**
- **Minimal muzzle flash**
- **Minimum trace distance 5.56/7.62 600 m (Gen. 2+)**
- **Fully ignited trace from 50 m**

Dim Tracer Projectile

**5.56 mm dim tracer round in accordance
with requirements in NATO STANAG
4172**



Dim Trace Emission & Responsivity

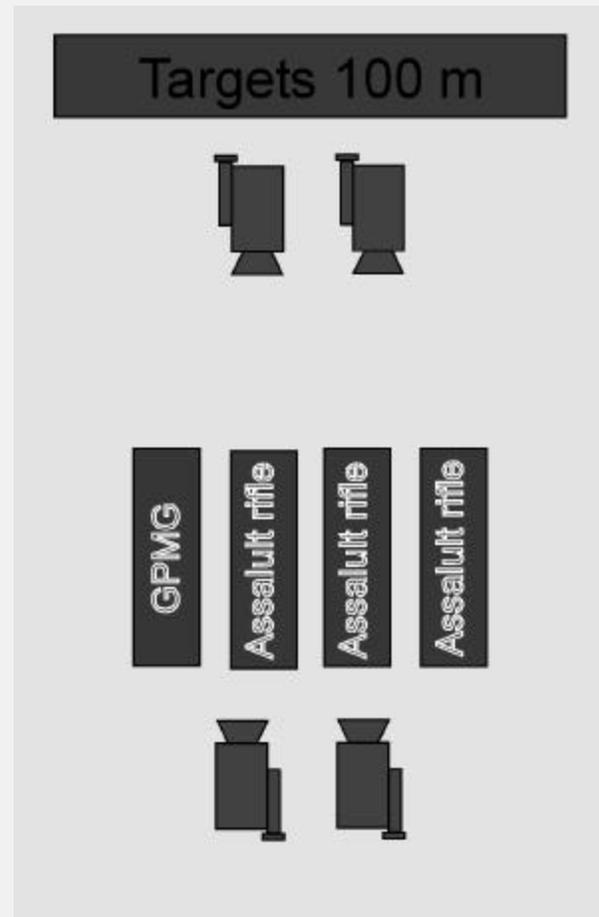


Source : Hansson Pyrotech AB

SAAD Dim Tracer Development Project

- **Final Development phase for 5.56 mm and 7.62 mm Dim Tracer in progress – Finalised February 2001**
- **Preparation for serial deliveries and deliveries during 2001.**
- **A co-operation between Nammo Small Arms Ammunition Division and Hansson Pyrotech**

Live Firings - Set-up



Technical Data 5.56 mm Dim Tracer

Cartridge Data

Weight	12.5g
Case Material	CuZn 28
Primer	4.5 mm
Propellant	Double base
Projectile weight	3.9 g
Jacket material	Steel CuZn 10 plated
Core material	Lead
Dimension	In accordance with STANAG 4172
Marking	Customer requirement

Technical data

Temperature range	Between -54C and +52 C
Muzzle velocity	Min 910m/s
Mean Chamber pressure	Max 380 Mpa (EPVAT)
Port pressure	Min 88 Mpa (EPVAT)
Accuracy 100 m	Sh and Ss max 60 mm, 30 rounds
Accuracy 550 m	Sh and Ss max 300 mm, 30 rounds
Trajectory	Matching SS 109/M855
Dim Trace	Visible at muzzle to min 600 m with image intensifiers (gen 2+)

