



Passive Panoramic Image Fusion (PPIF) for 360 Degree Situational Awareness to Support Operations in Urban Terrain

Presentation to Autoliv Electronics

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PPIF System Benefits

SUPERIOR TECHNOLOGY FOR A SUPERIOR ARMY



- ◆ Provides 360 degree situational awareness to the crew of a armored combat, surveillance and troop transport vehicle during the day or night. Real time, pixel based fusion of infrared and visual video with pan and zoom capability.
- ◆ Aids Armed Urban Operations with:
 - Surveillance
 - Peace keeping operations
 - Perimeter control
- ◆ 3 Band Fusion
 - Near IR
 - Far IR
 - Visible

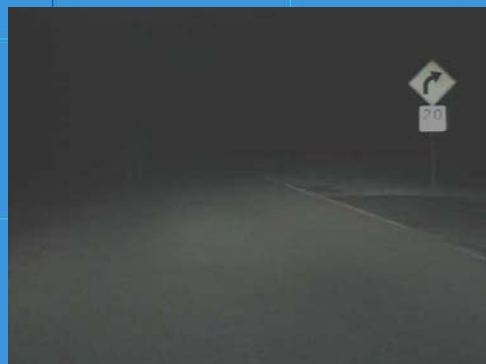




Night Vision (IR) and Visual Image Fusion in Real-Time

SUPERIOR TECHNOLOGY FOR A SUPERIOR ARMY

But only infrared image fused with visible light image show all features



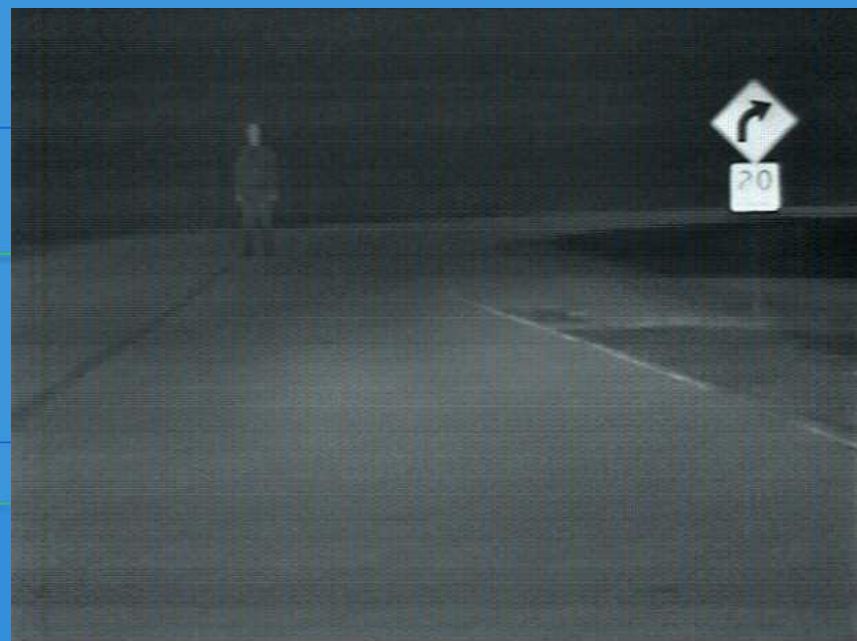
Visible image shows:

- Other vehicles
- Blinker, break lights
- lane markings
- Signs



Infrared image shows:

- Other vehicles
- Persons and animals
- Road beyond headlights



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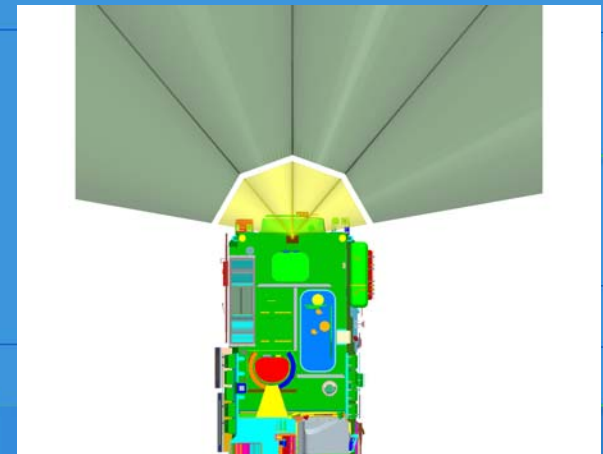




Navigator Prototype Kit

SUPERIOR TECHNOLOGY FOR A SUPERIOR ARMY

Fully Passive 360° Image Fusion Technology for
Homeland Defense with Modular Camera Kit





Present Version of System

SUPERIOR TECHNOLOGY FOR A SUPERIOR ARMY



Rugged version





PASSIVE PANORAMIC IMAGE FUSION (PPIF) SUPPORTING ARMED OPERATIONS IN URBAN TERRAIN

SUPERIOR TECHNOLOGY FOR A SUPERIOR ARMOR

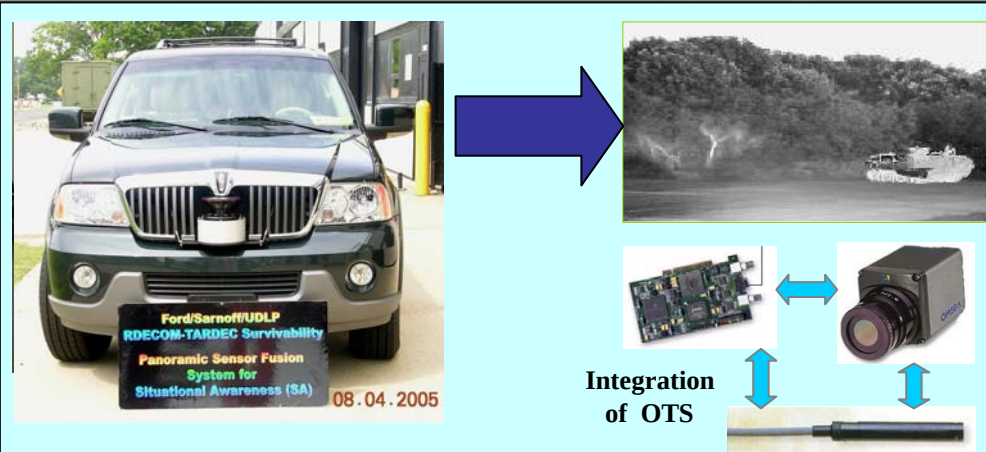
- PPIF was developed in collaboration with Ford and Sarnoff using OTS imaging sensors and software in the VPL

- **Benefits**

- In-theatre MOUT/peacekeeping operations
- Homeland defense
- Surveillance

- **Supporters**

- PM Stryker /BCT
- PM LTV
- PM LAV
- PM TV
- PM FCS
- Pentagon G2 office
- Secret Service



SYSTEM INTEGRATION



Marine LAV



HET FT06-07



Stryker FY05-06



Bradley FY06-07

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Features and Possible Options of an Image Fusion System

SUPERIOR TECHNOLOGY FOR A SUPERIOR ARMY

- ◆ 360° Panoramic View with portable display
- ◆ Systems for high speed convoys
- ◆ PASSIVE Day and Night System
 - Far IR
 - Near IR
 - Visible
- ◆ Recording Capability
- ◆ Threat Identification
- ◆ Automatic “Wakeup” and Warning on Threat Detection
- ◆ “Zoom-In” Capability
- ◆ Color Code Areas of Interest
- ◆ Automatically Track Moving Threats and Illuminate Them





Potential High Volume Applications for Night Vision

SUPERIOR TECHNOLOGY FOR A SUPERIOR ARMY

- High speed convoy (multiple vehicle, lights out driving) - 250
- Border surveillance (Homeland security and military) - 500
- Perimeter security around installations and bases - 200
- Night Vision for light tactical vehicles - 250
- Night Vision for marine search and rescue - 100. For example, Selfridge homeland security base.

Realistic estimate of quantities needed is around 1300 for the first year. Probably 1000 units/yr for the foreseeable future to upgrade and replace.

Cost per unit of under 5K ??

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Discussion items

SUPERIOR TECHNOLOGY FOR A SUPERIOR ARMY

- ◆ Integration and testing of a smaller and hardened military version of the image fusion system on a LAV or Stryker is of interest. TARDEC could be early users and integrators of the Autoliv cameras.

- ◆ We need less expensive, more durable infrared cameras and image processing platforms.

How could the cost of the IR cameras come down with large production?

