Advanced IR Sensors for Passive and Active Imaging Applications

AIM Infrarot-Module GmbH

Rainer Breiter

EPIC Online Technology Meeting on Photonics for Defense – Active and Passive Imaging Systems

October 27th, 2025

IR Technology at AIM

Key Figures

EMPLOYEES
~410

REVENUE
~91 Mio. €

OWNER
50% Diehl
50% Rheinmetall

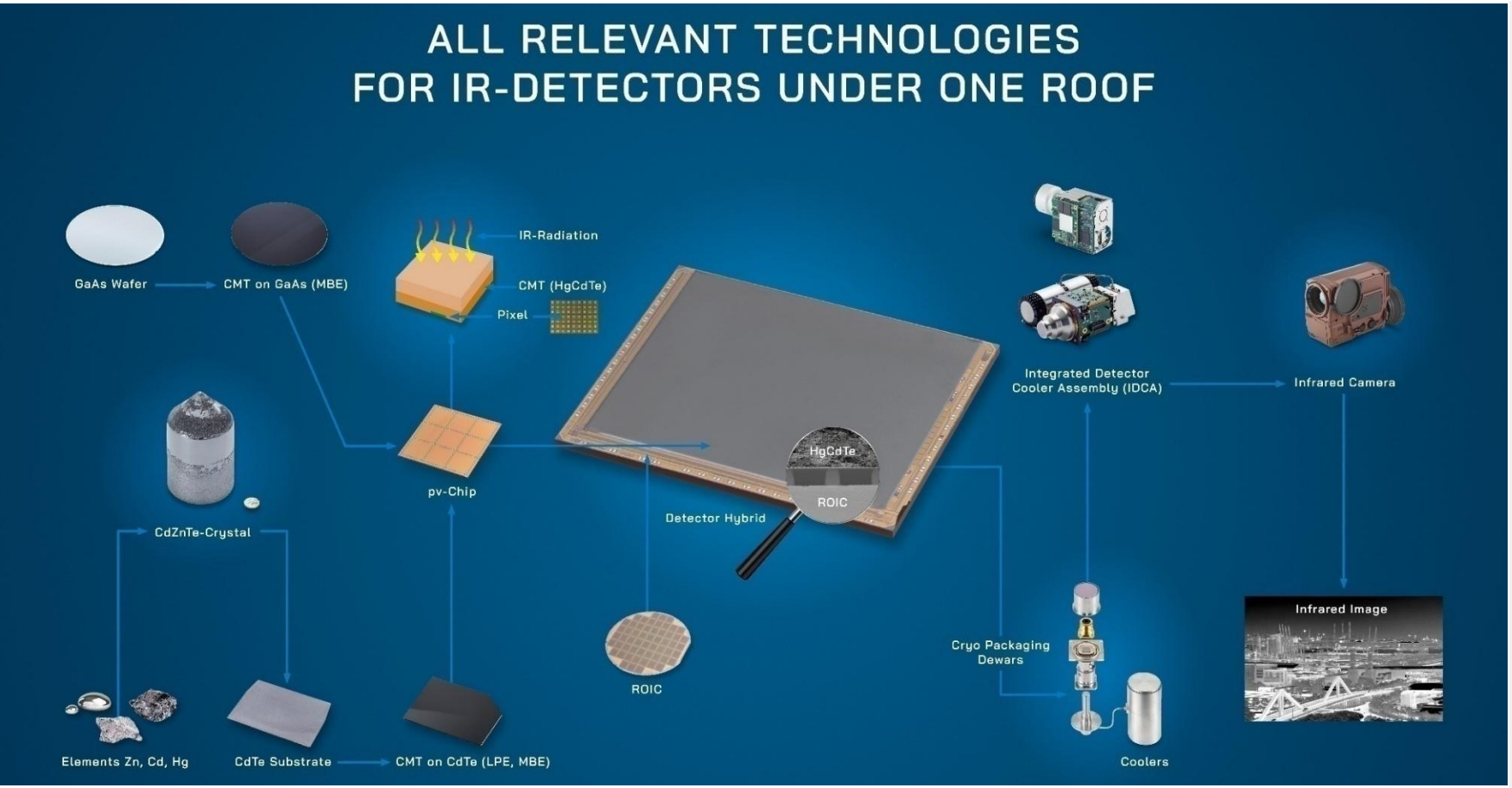
LOCATION
Germany

FACILITY
2.000sqm
clean room

National Key Technology
Made in Germany

IR Technology at AIM

Skills & Capabilities



- Coverage of the whole IR spectral range ($Hg_{1-x}Cd_xTe$): SWIR to VLWIR
- High resolution, low SWaP due small pixel pitch and HOT technology
- Dual-Color and Dual-Band technology

IR Technology at AIM

Infrared – not only night vision

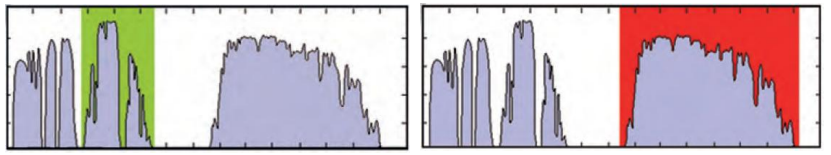
Source: TEMATYS SARL

Different conditions & tasks:

- **Condition:** Day, night, sunshine, fog, haze, rain, snow, turbulence, ...
- **Object:** Tanks, vehicles, UAVs, missiles, persons
- **Task:** Detection, recognition, identification

Advanced IR Sensors

MWIR or LWIR, high resolution and low SWaP



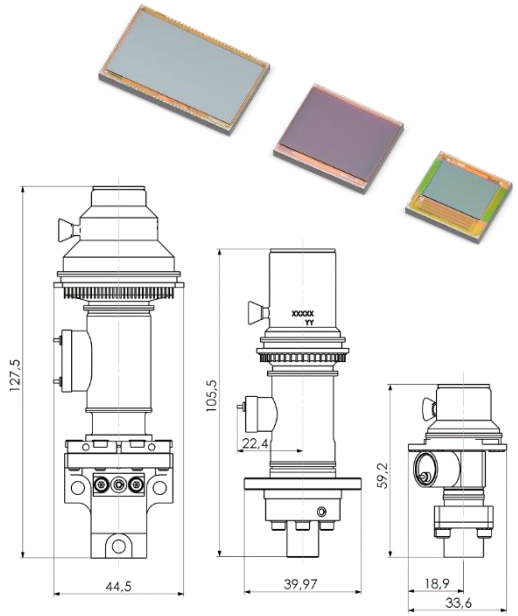
AIM

LPE MCT on CdTe

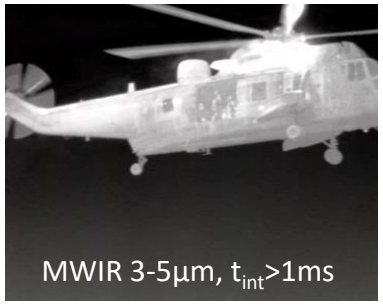
MWIR (3.4µm – 5.0µm)
Top 120K (p-on-n)

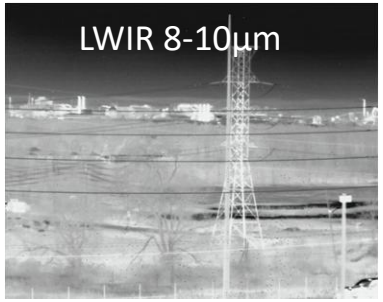
HOT MWIR (3.4µm – 4.8µm)
Top 160K (p-on-n)

LWIR (7.6µm – 9.0µm)
Top 100K (p-on-n)



- Small pixel pitch for higher resolution
- HOT technology for low Size, Weight and Power (SWaP)





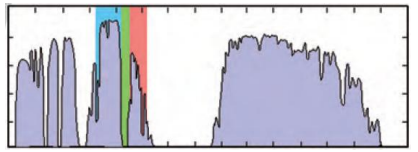
- **1280 x 720** / 12 µm pixel pitch
  - CHC ~7 Mio e^-
  - Framerate up to 75 Hz
- **1024 x 768** / 10 µm pixel pitch
  - CHC ~7 Mio e^-
  - Framerate up to 120 Hz
- **1280 x 1024** / 7.5 µm pixel pitch
  - CHC ~2.1 Mio e-
  - Framerate up to 60 Hz
- **HOT MWIR**
  - **1280 x 1024** / 7.5 µm pixel pitch
  - **1024 x 768** / 10 µm pixel pitch
  - **640 x 512** / 10 µm pixel pitch
  - Framerate up to 60 Hz

~ 1.2 kg / 15W

~ 0.4 kg / 4W

Advanced IR Sensors

Dual-Color SW/MW and MW/MW Detectors

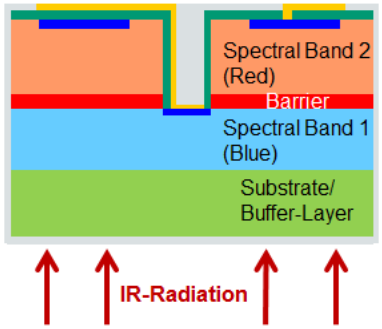


AIM

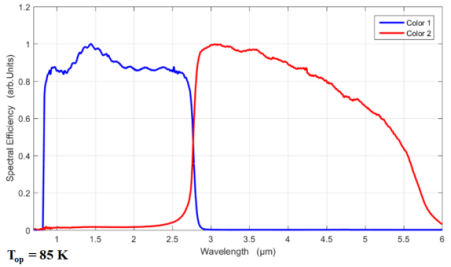
MBE MCT on GaAs

320x256 pixels, 30 µm pitch

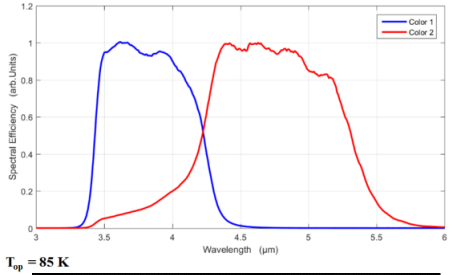
- **Spatial coincidence**:
  - Symmetrical and concentric areas for „blue“ and „red“ channels
- **Temporal coincidence**:
  - 2 contacts per pixel for „blue“ and „red“ channels (plus one common mass contact)
  - MCT n-on-p array technology



SW/MW



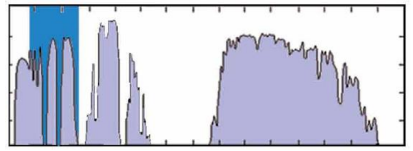
MW/MW



- Format **320x256**
- Pixel pitch 30µm
- ROIC
  - DI input stage
  - CHC low gain 18 Mio e^- / 6.5 Mio e^- (R/B)
  - CHC high gain 5 Mio e^- / 1.5 Mio e^- (R/B)
  - Clock 12 MHz
  - Snapshot, Integrate Then Read (ITR)
  - Modes: Signal Color, Dual Color, HDR
  - Framerate up to ~500 Hz
  - 8 Outputs (4 Red + 4 Blue)

Advanced IR Sensors

eSWIR Imaging, λco = 2.5µm



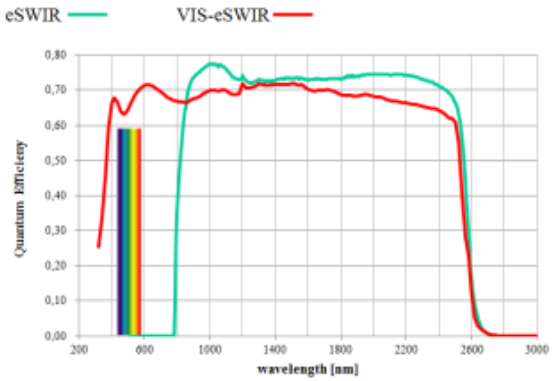
AIM

LPE MCT on CdTe

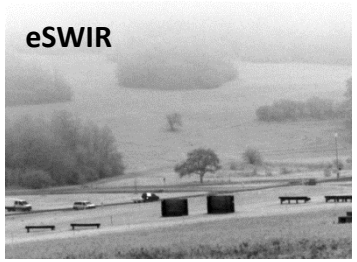
0.9µm - 2.5µm (eSWIR)

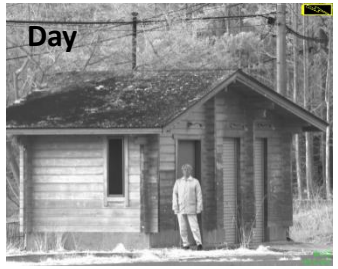
VIS Option 0.4µm – 2.5µm

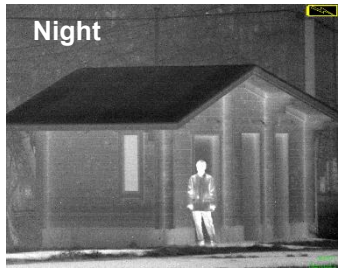
Top 150K-175K, cooled by stirling cooler

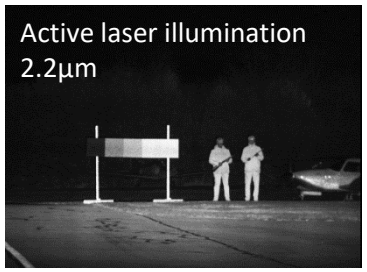


- Hyperspectral imaging
- Low light level imaging
- Active imaging by laser illumination









- **1024 x 256** / 24x32 µm² pixel pitch
  - Snapshot, ITR and IWR
  - Framerate up to 250 Hz
- **384 x 288** / 24x24 µm² pixel pitch
  - Snapshot, ITR and IWR
  - Framerate up to 450 Hz
- **640 x 512** / 15x15 µm² pixel pitch
  - Snapshot: ITR and IWR; Rolling Shutter
  - Framerate up to 120 Hz
- **640 x 512** / 10x10 µm² pixel pitch
  - Snapshot: ITR and IWR; Rolling Shutter
  - Framerate up to 100 Hz

AIM

Thank you for your attention !
Questions ?

AIM Infrarot-Module GmbH

EPIC Online Technology Meeting on Photonics for Defense – Active and Passive Imaging Systems

October 27th, 2025

END

AIM Infrarot-Module GmbH
Theresienstr. 2
D-74072 Heilbronn
www.aim-ir.com

Tel: +49 7131 / 6212 0
info@aim-ir.com

Rainer Breiter

Vice President IR-Module Programs

Tel. +49 (0) 7131 / 6212 400
E-Mail rainer.breiter@aim-ir.de