

IMAGING in the TERAHERTZ DOMAIN

Euripides project: eur 06-104

□ **Goal of the project:** room temperature, real-time, 2D THz camera demonstrator for security applications

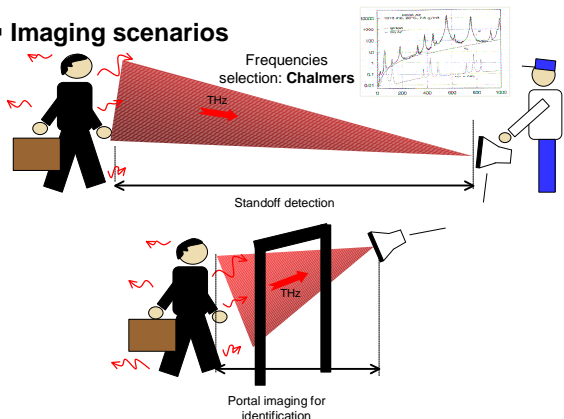
□ **Technical breakthrough:** 2D THz bolometer FPA

1. Antenna-coupled bolometer sensitive to THz frequencies
2. Monolithic 2D array fully compatible with standard Si technology
3. Sensibility compatible to room temperature operation

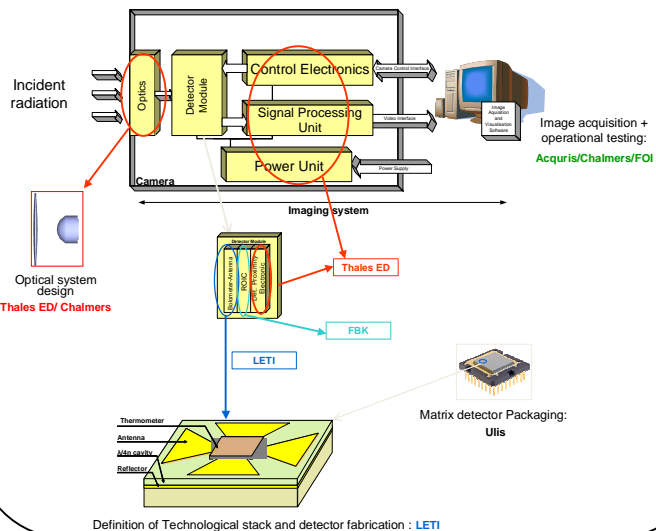
□ **Duration:** 48 months in 2 steps (1st step: 30 months / 2nd step: 18 months)

Imaging scenarios & THz imager

Imaging scenarios



THz imager



Specifications & Advantages

Target specifications:

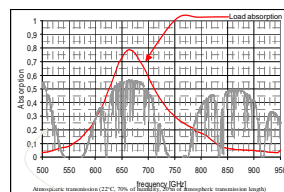
- 16x16 FPA (Focal Plane Array)
- Room temperature operation
- Standoff detection at short ranges (2.5-3 m for camera)
- Spatial resolution < 1 cm
- NEP < 1-2 pW/Hz^{1/2}
- Thermal resolution < 1K (target 0.5 K)
- Video frame rate :5 to 25 fps depending on scenarios

Key advantages:

- Passive imaging systems: safe and easy
- Uncooled systems: cost effective
- Real time → high throughput

Key features

- Pixel pitch: 200-230µm
- Frequency Band: 0,66 THz
- Pixel absorption coefficient:>80%
- Frequency bandwidth(3 dB): 140GHz

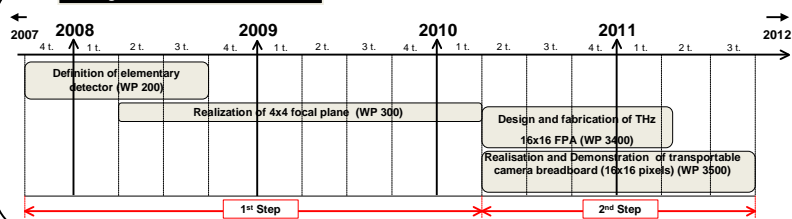


Current status

Frozen: Bolometer technological stack, Pixel design, ROIC design

In progress: bolometer manufacturing, Demonstrator Architecture design, ROIC manufacturing

Project timeline



Project partners and roles

Industries and enterprises

- THALES Electronics Devices (Moirans, France), Project coordinator
- ULIS, integration of THz sensors in dedicated packaging
- ACQRIS, Commercial aspects of THz imagery

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Research centres

- CEA LETI, Design (Modelling and optimization), foundry and characterization of the 2D sensor
- CHALMERS, Frequencies selection trade off
- FBK, ROIC Design
- FOI, THz imaging systems analysis

