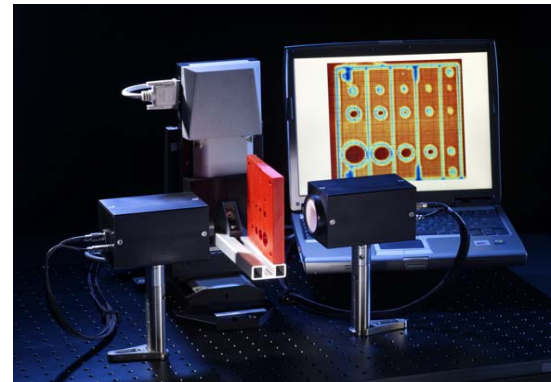


ARTEMIS - Antenna arRays for Terahertz Material Inspection and Security applications Fraunhofer IPM IEMN Villeneuve d'Ascq

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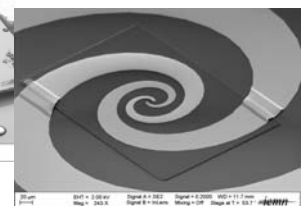


Objectives of the project and challenges

Terahertz (THz) technique is a very promising method for identification of concealed hazardous substances like explosives or drugs from a safe distance (standoff identification). Terahertz time-domain spectroscopy covers the spectral range from 0.1 to more than 3 THz in a single measurement. This spectral range is particularly well suited for this application but the acquisition time is still too long. The objective of the project is to reduce this time by a factor 100 using arrays of THz antennas and an optimized acquisition system. New antennas with improved performances and/or lower cost like horn antennas or antennas on silicon substrate will also be investigated.



THz horn antenna



THz spiral antenna on Si

Creation of long-term strategic French-German alliances

Strategic collaboration due to the complementary competences

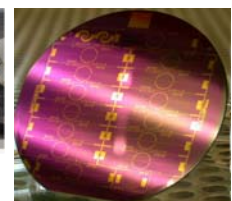
- IPM:
- Integration of optics, electronics and mechanics to an industrial grade system
 - Knowledge of security and industrial applications
- IEMN:
- Growing of semiconductor material for THz components
 - Manufacturing of THz antennas

Exchange of students and scientists to strengthen the partnership.

- Better understanding of works of the partner
- Improving the expertise of both partners



UV spectrometer
mounted on ISS



LTG GaAs wafer
with THz antennas

Expected results and market opportunities

Expected results are:

- Powerful emitter arrays and highly sensitive detector arrays
- Low temperature grown (LTG) GaAs antennas on Si substrate
- Low cost and performance optimized electronics for controlling antenna arrays
- Highly efficient NIR pump optics and THz optics

Due to these results the data acquisition time and system price can be reduced significantly. Both will have a positive effect on the industrial acceptance of this novel technique for non destructive testing and security applications



Painting of Airbus A380