GESEC R&D Inc.

X- RAY IMAGING TECHNOLOGY
MEDICAL, SECURITY, CONTROL AND SORTING APPLICATIONS

GESEC R&D develop a new type of X-ray detector, which converts directly X-ray photons into electrons, is sensitive to the instantaneous flux of X-rays. Since it is characterized by a fast response, it acquires the signal in a short time (in the µs range), thus allowing to reduce considerably the dose (flux multiplied by time of exposure) necessary to make an image.
For an object moving at 3.6 km/h (1 m/s), with a barrette of detectors taking 1 image/ms under typical radiography conditions (1 mSv/s delivered in 1 s), the dose received by the subject in 1 ms is 1 µSv. This dose is below "the negligible individual dose" (1 mSv/an), which corresponds to 2.7 µSv/day. It is also lower than the natural dose (6 µSv/day), or the dose received during a Paris-New York flight (20 µSv).

Compared with the detectors used actually (scintillator coupled with Si photodiode), detectors of GESEC R&D have a larger signal to noise ratio (S/N), a larger sensibility, a larger contrast of image. They can be used for medical, security, control and sorting imaging.

The images shown below, untreated, are obtained with an acquisition time on a pixel (1 mm^2) of 60 µs. These conditions are typical of modern computed tomography (CT).

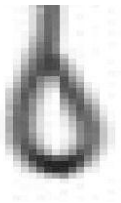


Image of a metallic wire (2 mm diameter) with a GESEC detector, (flux of 0.25 mSv/s). S/N = 10.

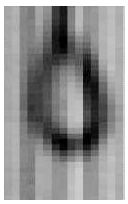


Image of metallic wire (2 mm diameter) with a scintillator (ceramic) detector, (flux of 1 mSv/s). S/N = 4.

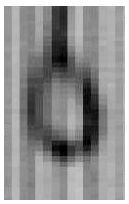
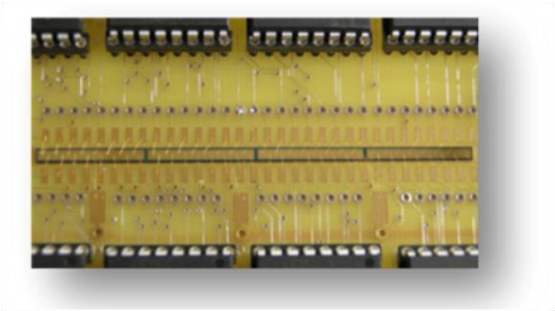


Image of a metallic wire (2 mm diameter) with a scintillator(CsI) detector, (flux of 1 mSv/s). S/N = 4.

The signal to noise ratio S/N of the GESEC detector is 10 times larger than that of a scintillator detector in the same conditions. These values are given for 40 kV but remain similar up to 120 kV.



Barrette of 64, 1 mm^2, pixels detectors.

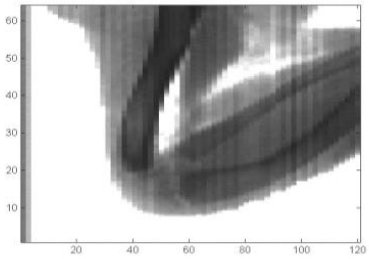


Image of a chicken wing at 60 kV, 10 mA, an acquisition time on a pixel (1 mm^2) of 60 µs.

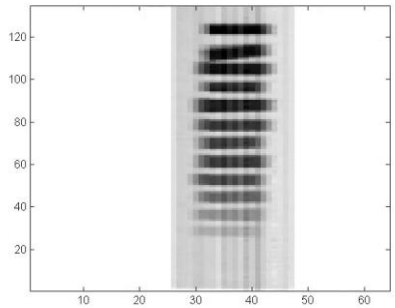


Image of Al foils of different thicknesses (40, 60, 100, 160, 200, 240, 300, 360, 400, 480, 560, 700 µm from bottom to top) at 30 kV, 30 mA, sticked on a 0.5 mm thick plastic foil.

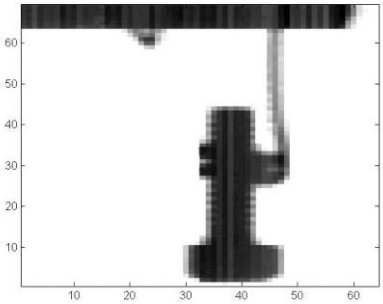


Image of a screw (length: 25 mm, diameter: 7.8 mm, pitch: 1 mm) at 60 kV, 10 mA, hold by a metallic wire.

GESEC R&D Inc. 2 Rue Fernand Gregh, 77810 Thomery, France
Tel/Fax: +33 9 61 65 73 59 Email: infos@gesec-rd.com website: www.gesec-rd.com