Image detection

By image detection we mean the recording of the **surface** or **spatial** distribution of certain physical parameters of the displayed scene and the conversion of this image function into another form of signal (e.g. an *electrical signal*), which has more favorable properties for further processing, display and storage. **Image detectors** (*sensors*) ensure the recording and transformation of the image signal . It is usually a two-dimensional array of a large number of suitable detection elements (transducers), which, in addition to the values of the displayed parameters of the scene, also provide spatial information about the exact location of the signal. Each detection element of the sensor records one **image point (pixel)** of the resulting image. For tomografic methods is the result of the detection of the so-called **voxel** (from the English Volumetric Pixel) – *volumetric element of the image*. In medicine, there are a number of commonly imaged scene parameters that can be recorded in a variety of ways.

Method	Physical parameter	Image detector
X-ray a CT imaging	X-ray attenuation	flat panel, photographic film, scintillation detectors
ultrasound imaging	reflectivity, attenuation	piezoelectric crystals
magnetic resonance	quantum behavior of atomic nuclei	coils
nuclear medicine (PET, SPECT, gammagraphy)	activity of radionuclides	scintillation detectors, flat panel
thermography	surface temperature (infrared radiation)	semiconductor detectors, liquid crystals
elastography	Young's modulus of elasticity	piezoelectric crystals, coils
electrodiagnostic mapping	electrical properties	electrode array
magnetodiagnostic mapping	magnetic properties	array od coils
microscopy, endoscopy	attenuation, reflection or scattering of electromagnetic radiation (UV, IR, VIS, microwaves)	semiconductor detectors
electric impedance tomography (EIT)	electric conductivity, permittivity	electrode array

Links

Used literature

- SEDLÁŘ, Martin – STAFFA, Erik – MORNSTEIN, Vojtěch. *Zobrazovací metody využívající neionizující záření* [online]. Brno : Institute of biophysics, Faculty of Medicine, Masaryk University in Brno, 2013, Available from <http://www.med.muni.cz/biofyz/zobrazovacimetody/files/zobrazovaci_metody.pdf>.