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## X-Ray Engineering (XRE): A UGCT spin-off company

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X-Ray Engineering was founded in 2011 as a spin-off company from UGCT (University of Ghent Centre for X-ray Tomography) and one of the leading institution for ground breaking computed tomography research. Our team has been in charge for the development of the centre's systems and had a hand in almost all of the developed software. The continuous collaboration with the centre is key in our future developments.

XRE offers consultancy services, dedicated software solutions and design and manufactures hardware for all your X-ray needs,. Recently 3 new state of the art microCT systems were added to our product line and these are illustrated in figure 1.

The MultiTom Micro and Micro+ CT series are modular and flexible multiresolution X-ray CT systems which are custom tailored to your applications. Different configurations are available, going from dedicated single source-detector systems inside a small footprint cabinet to highly flexible multi source-detector systems inside larger cabinets or bunker. The systems can be optimized for specific applications or configured offering a maximum flexibility. In application dedicated systems, X-ray source and detector a carefully chosen to maximize image quality and resolution. In highly flexible systems a combination of multiple X-ray sources and multiple detectors which offers the possibility to scan both large and very small objects in one system. Each X-ray system has a modular setup which allows hardware upgrades in existing systems or the upgrade of single components. This prolongs the lifetime of your X-ray system and reduces maintenance costs.

The MultiTom Core systems are specially designed to image entire cores or other elongated objects in 3D at high resolutions (below 5  $\mu\text{m}$ ). The systems have a unique hardware configuration and a series of dedicated software tools that enables the user to obtain more representative images of elongated samples without sacrificing resolution. Although the system is specially designed for core scanning, it is still possible to perform standard high resolution microCT imaging on a wide range of objects. The small footprint lead shielded cabinet is equipped with a large lead window which allows visual inspection of the sample while positioning and during scans. Full length 3D images of the core can be acquired using either helical scanning or stacked scanning with an automated stitching protocol. Optional connections for sensor wiring and (high pressure) tubing which enables in-situ 4D imaging. The vertical setup of the system is ideal to avoid any gravitational effects during in-situ 4D experiments.

The D4D is a microCT system dedicated to dynamic in-situ imaging. This system stands out from other microCT systems through unique hardware configuration and its high temporal resolution. The source and detector are mounted on a gantry and rotate in a horizontal plane around a fixed sample. This fixed sample configuration is ideal for the integration of peripheral equipment like pressure cells and flow cells which is connected to high pressure tubing and sensor wiring like triaxial flow cells which are connected to high pressure tubing and sensor wiring. This setup enabling in-situ imaging at high resolutions and avoids any effect related to sample movement.

When visualizing in-situ dynamic processes the acquisition time should be kept to a minimum to avoid movement artefacts. The D4D has temporal resolutions down to 10 seconds for a full 360 degree acquisition and is therefore one of the first systems which synchrotron speeds to the laboratory. For discrete events the temporal resolution can even be reduced to a matter of seconds using dedicated 4D software tools during acquisition and special reconstructions algorithms which are integrated into our modular software architecture for image acquisition Acquila.

## X-Ray Engineering



*Figure 1: X-ray Engineering's state of the art microCT systems ([www.xre.be](http://www.xre.be))*

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