**XTK Poster**
For Federal Laboratory Consortium for Tech Transfer

Title/Tag line:

X-ray Tool Kit (XTK) … *Image Processing & Analysis Software helps Emergency Responders Disable IEDs*
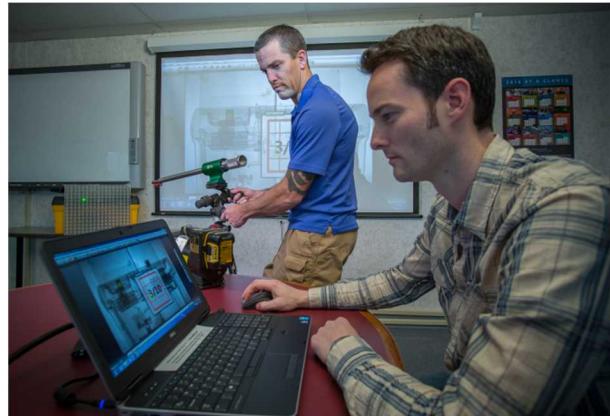
XTK Team Members demonstrate XTK's Grid-Aim feature to position a disruptor.

EOD Techs using XTK during a training exercise

Quote:

"WMDTech has provided XTK Software training to bomb squads all over the country, and even to U.S. military stationed overseas. This has been an extremely successful collaboration to increase the capabilities of our anti-terrorism forces throughout the world."

— **Christopher Brown**
Director of Sales/Training
WMDTech

Challenge Section:

Emergency responders need to be able to assess and disable Improvised Explosive Devices (IEDs) quickly.

These Explosive Ordnance Disposal (EOD) technicians typically used portable x-ray scanners coupled with specialized image processing software to help them analyze explosive devices. They had to maintain proficiency on multiple software packages, most originally developed for medical x-ray applications with excessive processing functions not applicable to EOD work. There was no software specifically designed to support their workflow.

North Carolina National Guard EOD techs analyzing x-ray image of a simulated bomb

US Navy EOD Tech examines remaining material from an IED disruption during a training exercise.

Solution Section:

XTK developers worked with EOD technicians, spending hundreds of hours alongside them to understand their workflow. They designed the XTK software with features that standardize and improve x-ray analysis of IEDs and support the natural workflow of EOD techs.

XTK Features include:

- Optimizing x-ray exposures with dose calculation and image processing

- Identifying internal device components

- Grid-Aim Tool for aiming a disruptor

- Supports image acquisition from a variety of commercial scanners

- Stitching multiple images together to cover large objects,

- Computing magnification factors for measuring

- 3D visualization to improve situational awareness and planning

- Incident File organization and image compression

Improvised Explosive Device (IED) Example
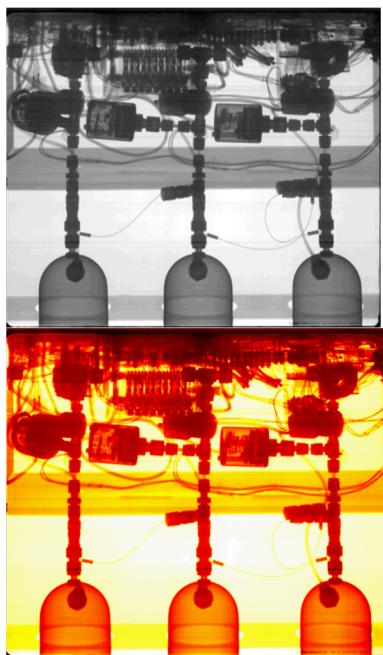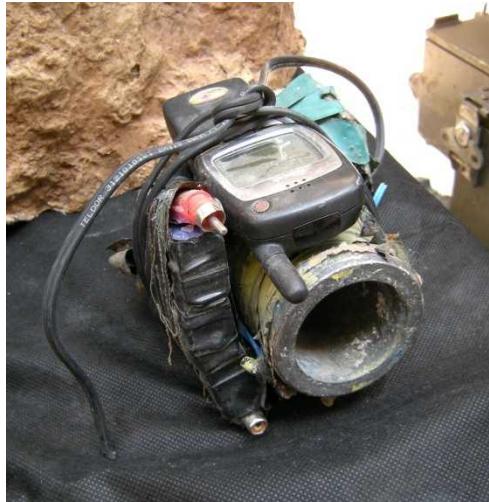
Optimizing x-ray exposures in XTK
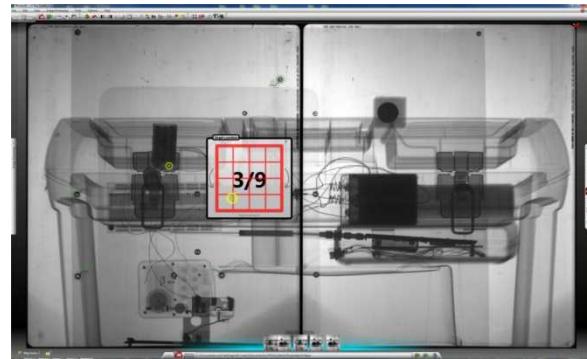
Grid Aim Example in XTK
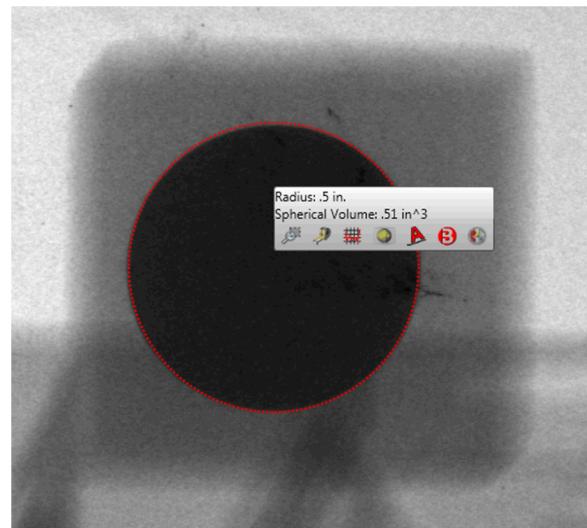
Computing magnification in XTK

3D Visualization in XTK
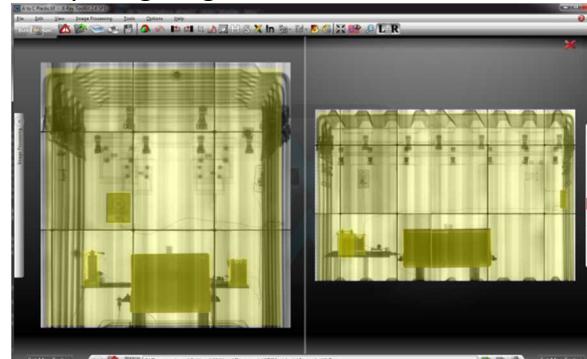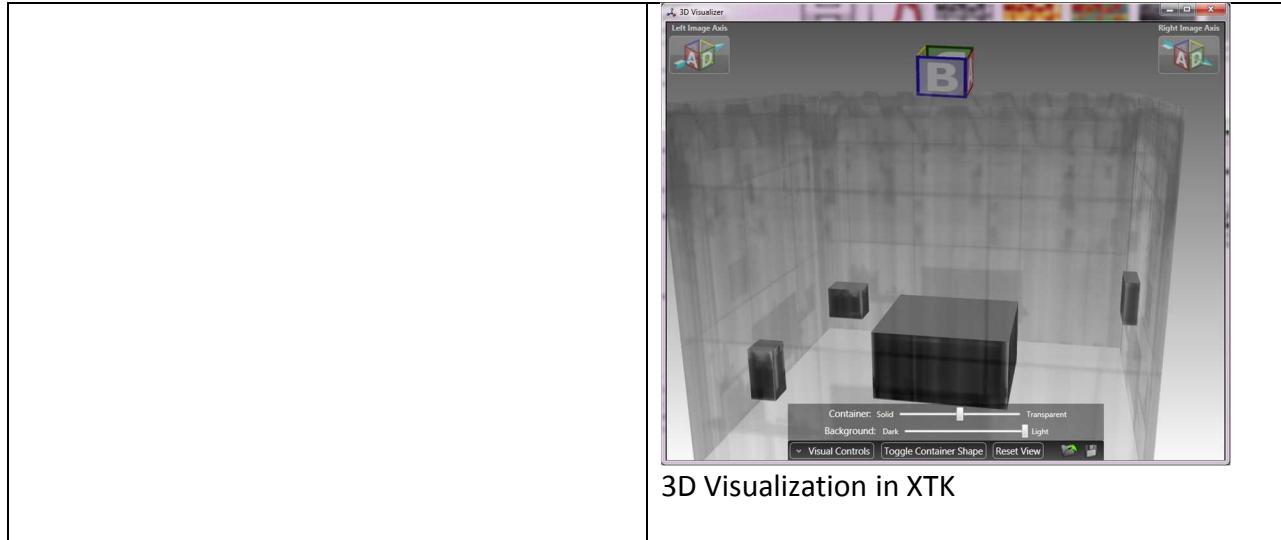
Impact Section:

Helping to save lives of Emergency Responders and those they serve and protect…

It puts a better tool into the hands of the heroes who disable IEDs, improving domestic and international security, and saving lives.

XTK, now the standard…

XTK has changed the way x-rays are used by thousands of EOD operators around the world, becoming a standard in the field.

In emergency situations, all personnel using the same software minimizes confusion and communication errors. In stressful, fast-paced situations, this can make all the difference in averting catastrophe, improving safety for emergency responders and the public.

EOD tech using XTK from within his response vehicle during a training exercise.

EOD techs using XTK to help analyze and disable an IED.

EOD Robot using X-ray scanner to X-ray vehicle contents during an exercise

Partnership Section:

Partnering spread the word…

Sandia originally developed XTK for the NNSA's Department of Energy to support their EOD technicians. The NNSA project manager, Marc Phipps, saw that XTK could allow *all* EOD techs, civilian and military, to do their jobs better and save lives. He suggested XTK be made available to the broader EOD community. Sandia agreed and offered XTK via no-cost end user licenses for all US state and local EOD technicians.

XTK is easy-to-use, but it takes training to utilize all of its features. Sandia licensed the technology to a number of training service companies. Six companies currently provide XTK training to the military, law enforcement, and other emergency responders. With these training partners, Sandia has been able to get XTK distributed widely in a very short time.

It is estimated that over 20,000 users have already been trained on XTK, with continuing additions. XTK is now being used in most of the 467 recognized non-military bomb squads across the US.

Widespread use of XTK has resulted in an estimated to-date savings of $10 million in licensing fees and training costs for the emergency response community.

Sidebars:

The FBI's Hazardous Devices School adopted XTK for its advanced training classes and recertification course beginning in 2012.

US Navy Photo

Sandia offers X-ray scanner manufacturers free test and evaluation licenses for XTK. This helps ensure that no matter what type of hardware EOD techs are using, XTK software will be compatible.