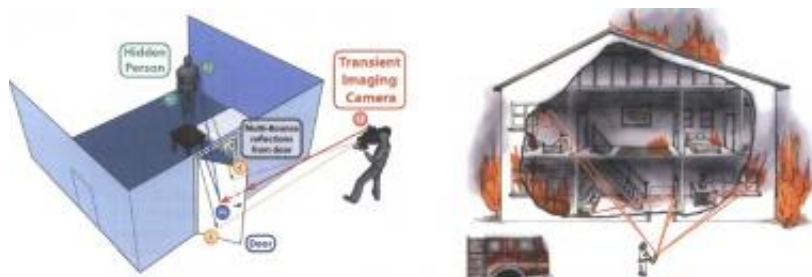


Laser-based camera can see around corners

November 17 2010, by Lisa Zyga



The left illustration shows how short light pulses are reflected off a door and scatter in different directions. Some of the light is reflected back to the camera, while some of it is reflected off a hidden object or person in the room. Some of this light is then reflected back to the door, where it can be captured by the camera and used to create an image of the hidden object or person. The right illustration shows the system being used for search and rescue in a burning building. Image credits: Ahmed Kirmani, MIT.

(PhysOrg.com) -- Researchers from MIT have developed a camera that can capture images of a scene that is not in its direct line of sight. The camera is equipped with a femtosecond laser, which fires extremely short bursts of light that can reflect off one object (such as a door or mirror) and then a second object before reflecting back to the first object and being captured by the camera. Algorithms can then use this information to reconstruct the hidden scene.

The laser-based camera system is being designed by MIT Professor Ramesh Raskar and others. They call the system a "femtosecond transient imaging system," and explain that it exploits the fact that it is

possible to capture light at extremely short time scales, about one quadrillionth of a second. By continuously gathering light and computing the time and distance that each pixel has traveled, the [camera](#) creates a "3D time-image" of the scene.

"It's like having x-ray vision without the x-rays," Raskar said. "We're going around the problem rather than going through it."

The researchers are still in the early stages of development and are working on accurately mapping more complex scenes. They predict that the system could have a variety of applications. For instance, it could be used for search and rescue missions to search for survivors in a collapsed building or a building on fire. It could also be used for avoiding car collisions at blind corners, for machine vision, and for inspecting industrial objects with hidden surfaces. It could have similar biomedical imaging applications by allowing doctors to use endoscopes to view areas inside the body that are normally hidden. The researchers noted that a portable imaging system in the form of an endoscope could be ready in the next two years.

More information: ["Femtosecond Transient Imaging"](#) by Ahmed Kirmani

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