

JOHN M.
DOYLE

READY FOR PRIMETIME

Indian movie star Shah Rukh Khan caused an uproar last month when he claimed female security staff at London's Heathrow Airport printed a revealing copy of his image when he passed through a new whole-body scanner.

"You could see everything inside," Khan told the BBC. Heathrow officials refuted his story, noting the machines do not print images.

But the flap underscores the controversy dogging whole-body imaging as a way of spotting objects that metal detectors cannot, such as ceramic knives and explosives. Critics liken the computerized imagery to a virtual strip search. Others raise health concerns because the scanners use low-level X-rays or microwaves to penetrate clothing.

Since the attempted Christmas bombing of a Detroit-bound flight from Amsterdam, airports in Italy, the Netherlands and Britain have installed body-scanning machines to screen U.S.-bound passengers. Australia plans to introduce body scanners at three airports starting in 2011, and the U.S. Transportation Security Administration wants 490 to be in American airports by year's end.

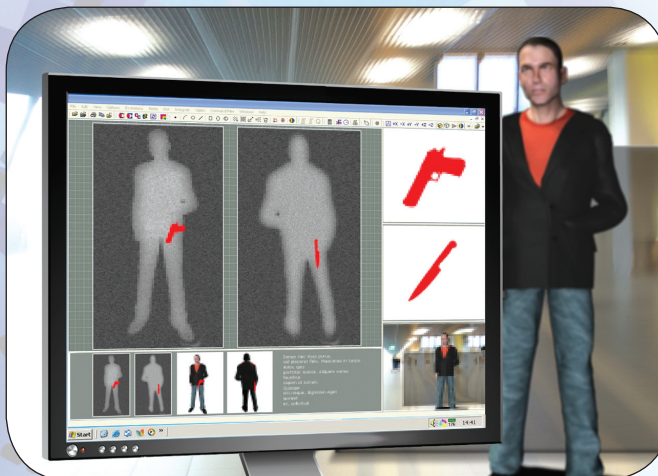
Whole-body scanning machines use backscatter X-ray or millimeter-wave (MW) technologies to create an image of a person similar to a photographic negative. They are used at airports, prisons and military bases around the world, says Peter Kant, vice president for global government affairs at Rapiscan Systems, a U.S. maker of backscatter machines.

X-rays and millimeter waves penetrate clothing to illuminate foreign objects. Leading manufacturers include L-3 Communications, Smiths Detection and Rapiscan. The American College of Radiology says neither technology poses a "significant biological" threat. Officials and manufacturers also note the machines do not store images, and software obscures the face and genitals.

Nevertheless, there is resistance

from civil liberties groups, parents, frequent flyers and lawmakers. The debate prompted several companies to offer alternative technologies such as passive MW and terahertz-wave scanning.

Several companies manufacture passive MW scanners, among them Brijot Imaging Systems, Millivision Technologies and Qinetiq. They do not transmit waves but passively read the



MMIC SOLUTIONS CONCEPT

Passive millimeter wave and terahertz wave-scanning systems identify the difference between naturally occurring waves emitted by the body and inanimate objects. Threats are highlighted on images without revealing intimate body details.

millimeter-wave emissions given off by all objects. "The active [MW] systems transmit stuff at you like sonar, whereas passive systems are essentially like a thermal camera," explains John McNicol, business development director of Britain's MMIC Solutions, which makes MW components. Passive MW systems do create a revealing image. But most manufacturers block that from security personnel, instead highlighting suspicious materials with a red box or outline on a simultaneous, noninvasive video feed.

Two British companies think another solution rests with scanning waves coming off the body and inanimate objects through the terahertz electromagnetic spectrum, which lies between radio and light waves. Tera-

View of Cambridge, England, doesn't even create an image of the body with its terahertz scan, eliminating privacy concerns, says CEO Don Arnone.

The terahertz spectrum is sensitive to the presence of explosives—each kind has a unique chemical signature that TeraView archives in a database. "You can use this to establish whether somebody has a hidden explosive on them," says Arnone.

TeraView actively illuminates the screening subject with terahertz waves to look for a characteristic absorption pattern of explosives in the reflected light. This is done without a revealing body image and that, says Arnone, could eliminate the need for a screener to interpret the image. "That's the perfect thing, if you can have a red-light/green-light system" that takes the screener out of the equation, says Brian Ruttenbur, a homeland security and defense analyst at securities firm Morgan Keegan. Rapiscan will soon introduce an automated

backscatter X-ray scanner, Kant says.

The other company using terahertz technology, ThruVision, creates a shadowy image of the subject but delineates foreign objects beneath the clothes. ThruVision is marketing equipment that screens individuals for guns, knives, explosives and other contraband from 10-15 meters (33-50 ft.) away. The company also manufactures indoor and outdoor scanners, screening people in groups as they walk past. Providing security personnel with enough information to nab a suspect, though, can be a problem, says Ruttenbur. "I don't know how well that works when you've got a crowd."

Experts agree there is nothing available that detects explosives in a body cavity. Nor is there a "silver bullet" that catches all explosives, says Clark Kent Ervin, former inspector general of the U.S. Homeland Security Dept. "There's got to be a complementary suite of technologies." ■

Read Doyle's posts on DTI's weblog,  
Ares, updated daily:
AviationWeek.com/ares