



Science and Technology

TRANSPORTATION SECURITY & EXPLOSIVES CHARACTERIZATION

HUMAN PHANTOM FOR MILLIMETER WAVE IMAGING TEST AND EVALUATION

HUMAN-LIKE MODEL THAT SAFELY AND ACCURATELY TESTS MILLIMETER WAVE-BASED ADVANCED IMAGING TECHNOLOGY (AIT) SYSTEMS.

Millimeter wave (MMW) imaging systems are used to screen people for dangerous items such as weapons, explosives, and contraband. MMW machines send out radiation that bounces off the body and concealed object(s) to create an image. Currently, testing is largely performed with mock passengers wearing live or simulated threats. Replacing humans with mannequins would provide a number of benefits, including reducing manpower costs associated with testing, and improving safety and repeatability.

This human phantom model solves current challenges by using a thin, lightweight conductive “skin” that provides reflectivity similar to that of the human body without the use of magnetic materials. The underlying structure can be configured to match humans of different ages, genders, and body mass index values. Testing with these phantoms would allow for screening of hazardous threats that cannot currently be utilized with live humans and would be more representative of the traveling public.

KEY BENEFITS

- + Reduces or eliminates manpower required to perform testing of MMW AIT systems
- + Expands testing for more hazardous threats of interest
- + Provides access to a wider range of human body shapes
- + Inexpensive, lightweight materials

STAGE OF DEVELOPMENT

Proof of Concept

PARTNERSHIP SOUGHT

Sources sought for manufacturing of prototype(s)

INVENTORS

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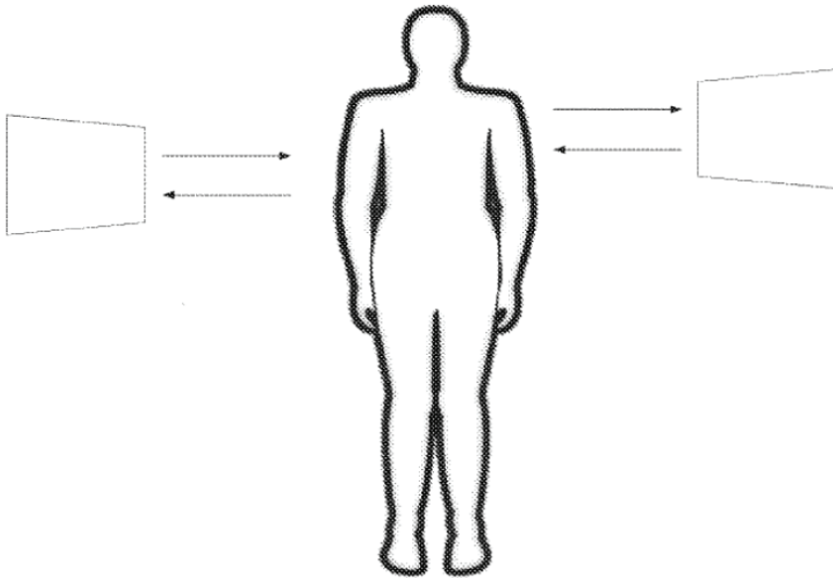
DHS COMPONENT

Science and Technology Directorate

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THE TECHNOLOGY

The subject technology includes a human phantom composed of artificial skin, made of radar-absorbing and conductive layers, configured to provide reflections similar to human skin. The skin's conductivity can be tuned to match the skin as a function of operating frequency in the gigahertz range. The system can be shaped to create human forms of different ages, genders and body mass index values.



The figure depicts the implementation of a human phantom containing the artificial skin used to test active MMW imaging systems to determine whether the systems are capable of distinguishing between human skin and a threat object.

APPLICATIONS

The technology has several potential end use cases:

SECURITY CHECKPOINTS

- + Medical devices and prosthetic imaging
- + 3D body imaging for apparel design
- + Testing radio frequency emissions from consumer electronics

PATENT INFORMATION

U.S. Patent numbers 10,254,170, 10,267,904, 10,697,834, and 10,973,958



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TECHNOLOGY SOLUTIONS

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