

(12) **United States Patent**
Bishop et al.

(10) **Patent No.:** US 7,782,251 B2
(45) **Date of Patent:** Aug. 24, 2010

(54) **MOBILE MILLIMETER WAVE IMAGING RADAR SYSTEM**

7,692,571 B2 * 4/2010 Lovberg et al. 342/52

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(Continued)

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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(21) Appl. No.: **12/286,981**

(57) **ABSTRACT**

(22) Filed: **Oct. 3, 2008**

(65) **Prior Publication Data**
US 2009/0135051 A1 May 28, 2009

A short range millimeter wave imaging radar system. The system includes electronics adapted to produce millimeter wave radiation scanned over a frequency range of a few gigahertz. The scanned millimeter wave radiation is broadcast through a frequency scanned transmit antenna to produce a narrow transmit beam in a first scanned direction (such as the vertical direction) corresponding to the scanned millimeter wave frequencies. The transmit antenna is scanned to transmit beam in a second direction perpendicular to the first scanned direction (such as the horizontal or the azimuthal direction) so as to define a two-dimensional field of view. Reflected millimeter wave radiation is collected in a receive frequency scanned antenna co-located (or approximately co-located) with the transmit antenna and adapted to produce a narrow receive beam approximately co-directed in the same directions as the transmitted beam in approximately the same field of view. Computer processor equipment compares the intensity of the receive millimeter radar signals for a pre-determined set of ranges and known directions of the transmit and receive beams as a function of time to produce a radar image of at least a desired portion of the field of view. In preferred embodiment the invention is mounted on a truck and adapted as a FOD finder system to detect and locate FOD on airport surfaces.

Related U.S. Application Data

(60) Provisional application No. 61/007,719, filed on Dec. 14, 2007, provisional application No. 60/998,000, filed on Oct. 6, 2007.

(51) **Int. Cl.**
G01S 13/89 (2006.01)

(52) **U.S. Cl.** 342/179; 342/22; 342/27

(58) **Field of Classification Search** 342/22, 342/27, 179, 100–103

See application file for complete search history.

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10 Claims, 13 Drawing Sheets

