



US006943724B1

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

(10) **Patent No.:** **US 6,943,724 B1**  
(45) **Date of Patent:** **Sep. 13, 2005**

(54) **IDENTIFICATION AND TRACKING OF MOVING OBJECTS IN DETECTED SYNTHETIC APERTURE IMAGERY**

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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.

(21) Appl. No.: **10/645,365**

(22) Filed: **Aug. 21, 2003**

**Related U.S. Application Data**

(60) Provisional application No. 60/422,326, filed on Oct. 30, 2002.

(51) **Int. Cl.**<sup>7</sup> ..... **G01S 13/90**

(52) **U.S. Cl.** ..... **342/25 B; 342/25 R; 342/25 A; 342/25 F; 342/89; 342/90; 342/175; 342/195; 342/196**

(58) **Field of Search** ..... **342/25 R-25 F, 342/25, 27, 28, 89, 90, 118, 145, 147, 158, 342/159-164, 175, 176, 179, 190-197; 382/100, 382/103**

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(57) **ABSTRACT**

A method of tracking a moving object in an image created by use of a synthetic aperture includes identifying a plurality of receive phase centers for an image collector, obtaining a synthetic aperture image using the plurality of receive phase centers, and reading a signature of the moving object based on the synthetic aperture image, where the reading of the signature includes identifying, in the synthetic aperture image, as a function of image collection time, a presence of the moving object. The reading of the signature may also include identifying a changing position of the moving object, and may include associating a plurality of range difference values with respective ones of the plurality of phase centers. A signature of a scatterer may be formed using only its associated  $\Delta R$ -versus-time profile. The presence of a mover in the image may be determined by filtering the image to detect all or part of a signature, or by using one or more signatures to train a neural network to observe the mover directly.

**49 Claims, 9 Drawing Sheets**

