



US006967574B1

(12) **United States Patent**  
Nelson

(10) **Patent No.:** US **6,967,574 B1**  
(45) **Date of Patent:** Nov. 22, 2005

(54) **MULTI-MODE ELECTROMAGNETIC TARGET DISCRIMINATOR SENSOR SYSTEM AND METHOD OF OPERATION THEREOF**

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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 177 days.

(21) Appl. No.: **10/742,046**

(22) Filed: **Dec. 19, 2003**

**Related U.S. Application Data**

(60) Provisional application No. 60/441,431, filed on Jan. 21, 2003.

(51) **Int. Cl.**<sup>7</sup> ..... **G08B 13/24**

(52) **U.S. Cl.** ..... **340/551; 340/552; 340/572.2; 324/228; 324/239; 342/70**

(58) **Field of Search** ..... **340/551, 552, 340/572.2, 572.4, 572.7; 324/228, 239; 342/70**

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(57) **ABSTRACT**

A multi-mode electromagnetic target discrimination sensor system for transmitting an electromagnetic signal and receiving a reflected signal from at least one target is disclosed having a variable inductance antenna having a variable inductance transmitter and a variable inductance receiver for varying at least one of operating bandwidth, sensitivity and size of the antenna, a processor for alternating between a time domain operating mode and a frequency domain operating mode, and controlling the variation of the inductance of the variable inductance antenna based on a current operating mode, and at least one processing algorithm for receiving signals from the receiver, discriminating targets from the received signals, and outputting the discrimination results is disclosed.

**25 Claims, 16 Drawing Sheets**

