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Sabet et al.

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- (54) **MULTIFUNCTION ANTENNA FOR WIRELESS AND TELEMATIC APPLICATIONS**
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- Related U.S. Application Data**
- (63) Continuation-in-part of application No. 09/758,955, filed on Jan. 11, 2001, now Pat. No. 6,480,162.
- (60) Provisional application No. 60/175,790, filed on Jan. 12, 2000.
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- (52) **U.S. Cl.** **343/770**; 343/765; 343/700 MS
- (58) **Field of Search** 343/770, 700 MS, 343/767, 826, 765, 737, 742, 776, 810, 702, 893, 769, 725; H01Q 1/24, 13/10, 1/38

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(57) **ABSTRACT**

A multifunction printed antenna for wireless and telematic applications. In one embodiment, GPS and satellite radio patch antenna elements are printed on one side of a printed circuit board and AMPS, PCS, GSM and terrestrial radio slot antenna elements are etched in a ground plane on an opposite side of the same printed circuit board. In an alternate embodiment, the GPS and satellite radio patch antenna elements are elements mounted on one printed circuit board and the AMPS, GSM, PCS and terrestrial radio slot antenna elements are etched in a ground plane on another printed circuit board rigidly secured orthogonal to the GPS and satellite printed circuit board. The AMPS, GSM and PCS circuit board can be curved to reduce the nulls at the edges of the circuit board. Further, the edge of the AMPS, GSM and PCS circuit board that contacts the GPS and satellite radio circuit board can have a saw-tooth pattern so that edge currents are reduced.

37 Claims, 13 Drawing Sheets

