



US006384773B1

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

(10) **Patent No.:** **US 6,384,773 B1**

(45) **Date of Patent:** **May 7, 2002**

(54) **ADAPTIVE FRAGMENTATION AND FREQUENCY TRANSLATION OF CONTINUOUS SPECTRUM WAVEFORM TO MAKE USE OF DISCONTINUOUS UNOCCUPIED SEGMENTS OF COMMUNICATION BANDWIDTH**

(75) Inventors: **Gayle Patrick Martin**, Merritt Island;
John Shipley, Sebastian, both of FL (US)

(73) Assignee: **Harris Corporation**, Melbourne, FL (US)

(*) 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.: **09/737,707**

(22) Filed: **Dec. 15, 2000**

(51) **Int. Cl.**⁷ **G01S 13/00**; H04B 15/00; H04L 27/30

(52) **U.S. Cl.** **342/202**; 342/21; 342/82; 342/159; 342/175; 455/63; 375/130; 375/139; 375/140; 375/146

(58) **Field of Search** 342/192-197; 342/200-204; 82-88; 159-164; 21; 375/130-153; 455/63; 64; 65; 370/342

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,443,799 A	*	4/1984	Rubin	342/201
5,359,624 A	*	10/1994	Lee et al.	370/342
6,023,488 A	*	2/2000	White	375/146

* cited by examiner

Primary Examiner—Bernarr E. Gregory
(74) *Attorney, Agent, or Firm*—Allen, Dyer, Doppelt, Milbrath & Gilchrist, P.A.

(57) **ABSTRACT**

Identity transform filters, such as $\sin(x)/x$ filters, are used to coherently fragment the frequency continuum of a wideband waveform, such as an ultra wideband radar signal, into a plurality of spectral segments that are capable of fitting into unoccupied spectral regions of a partially occupied electromagnetic spectrum. The wideband waveform has a bandwidth that falls within the partially occupied portion of the electromagnetic spectrum, and exceeds that of any unoccupied spectral region. The total useable bandwidth of the unoccupied regions is at least equal to that of the wideband waveform.

14 Claims, 6 Drawing Sheets

