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# United States Patent [19] Monroe

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## [54] ACOUSTIC CATASTROPHIC EVENT DETECTION AND DATA CAPTURE AND RETRIEVAL SYSTEM FOR AIRCRAFT

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[73] Assignee: **Raytheon TI Systems, Inc.**, Lewisville, Tex.

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### Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 729,139, Oct. 11, 1996.  
[51] Int. Cl.<sup>6</sup> ..... **H04N 7/18; G11B 5/02; G06F 15/74**  
[52] U.S. Cl. .... **73/587; 701/14; 360/5**  
[58] Field of Search ..... **73/587; 364/424.06, 364/439, DIG. 1, DIG. 2; 360/5; 342/32, 36, 357; 340/945; 701/14**

### [56] References Cited

#### U.S. PATENT DOCUMENTS

3,956,731 5/1976 Lewis, Jr. .... 340/945  
4,510,803 4/1985 Perara ..... 73/178 R  
4,592,034 5/1986 Sachse et al. .... 73/587  
4,729,102 3/1988 Miller, Jr. et al. .... 364/424

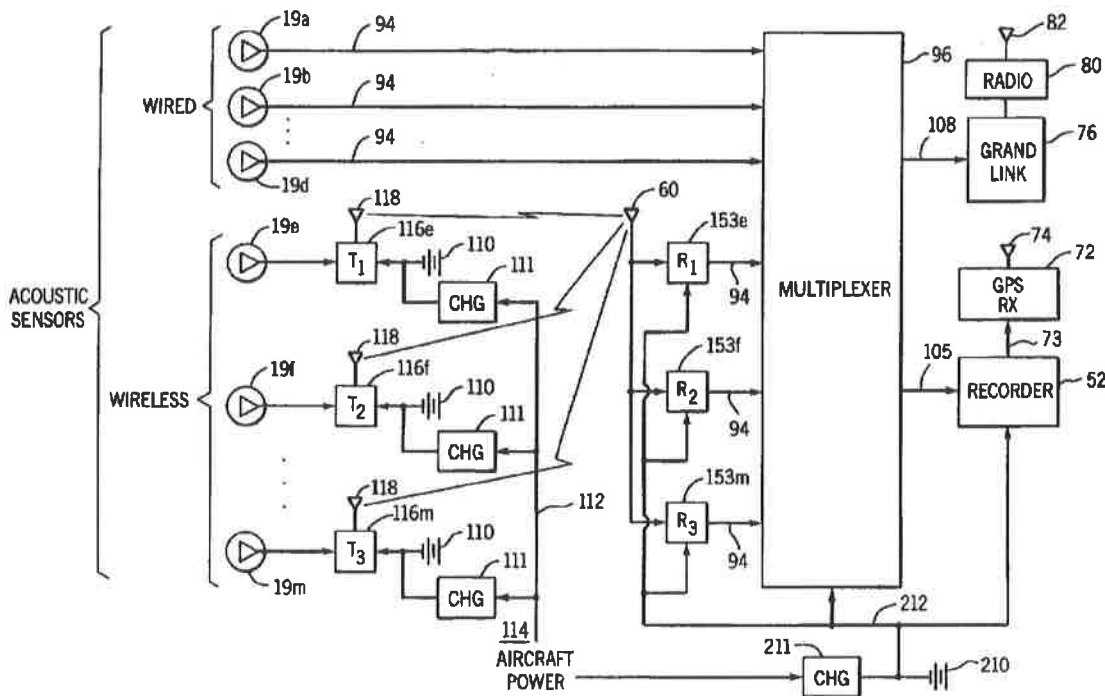
4,816,828 3/1989 Feher ..... 340/945  
4,910,718 3/1990 Horn ..... 367/124  
4,927,299 5/1990 Ramalingam et al. .... 407/120  
5,014,206 5/1991 Scribner et al. .... 364/449  
5,184,516 2/1993 Blazic et al. .... 73/799  
5,467,274 11/1995 Vax ..... 364/424.06  
5,528,557 6/1996 Hom ..... 73/587

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### [57] ABSTRACT

An acoustic sensor system is provided for detecting failures or terrorist events in commercial aviation and is adapted for assisting in the detection and post event analysis of such events. The system is adapted for use in combination with a comprehensive multi-media safety and surveillance system, utilizing both visual and audio information as well as critical data to the flight crew, and to a ground tracking station, and recording the information and data generated during flight. A plurality of acoustic sensors are strategically and systematically placed about an airframe. The sensors are adapted for communicating with a monitor/recording system and may be hard wired or utilize wireless communications therewith. In the event of a catastrophic event, such as a bomb explosion, a gunshot or structural failure an acoustic event would be recorded for later analysis.

21 Claims, 11 Drawing Sheets



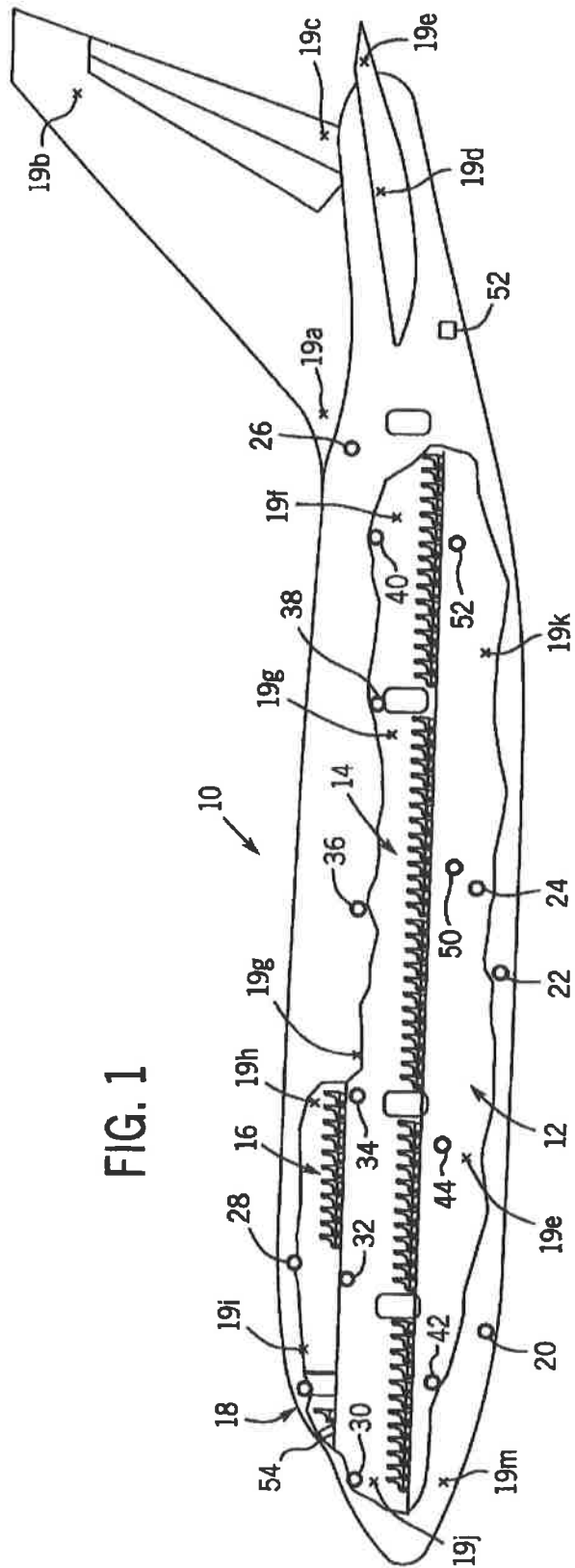


FIG. 1

FIG. 2

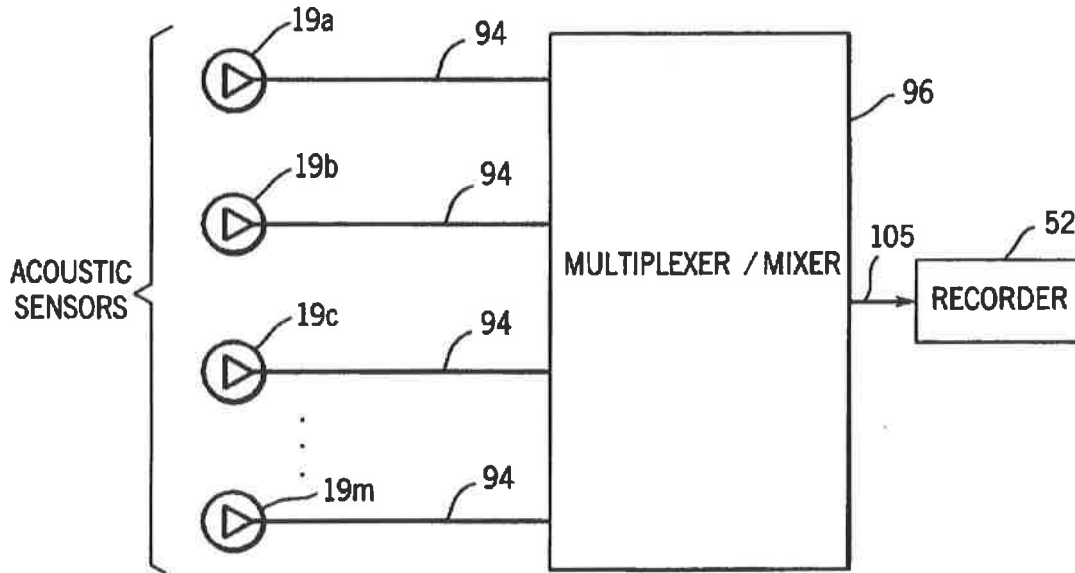
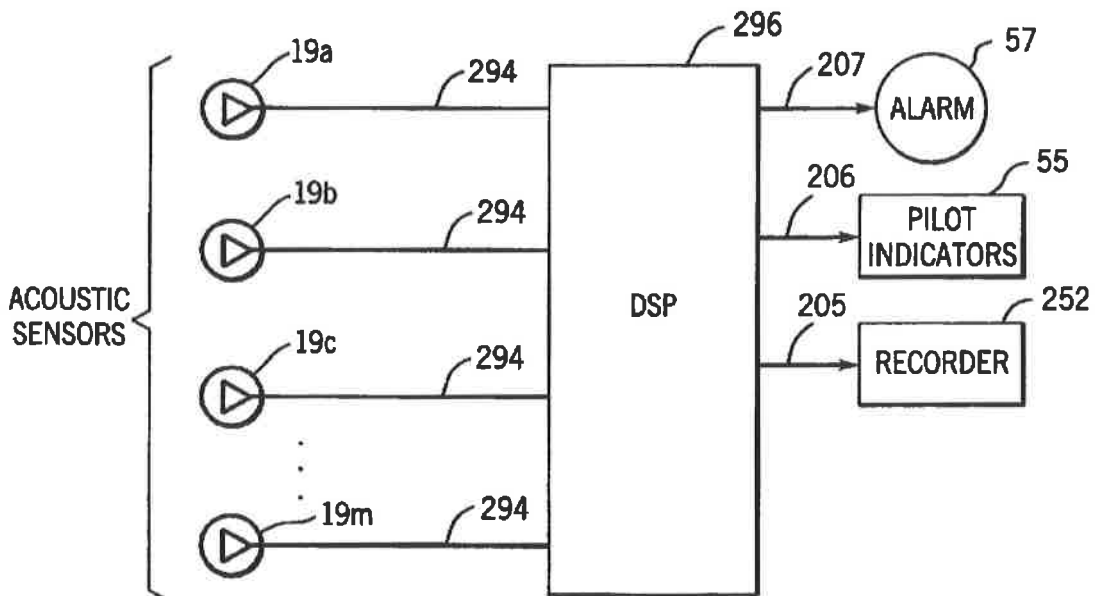


FIG. 3



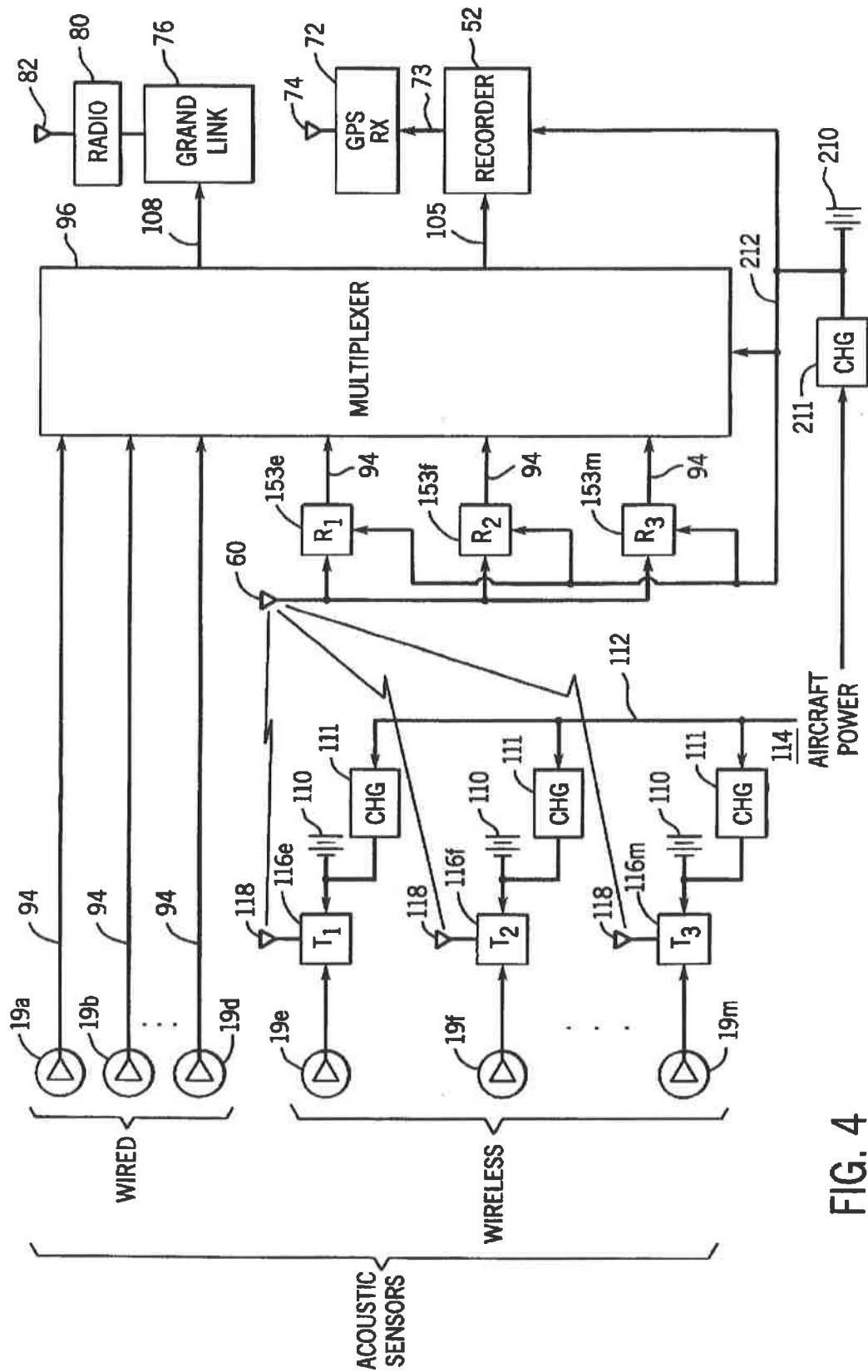


FIG. 4

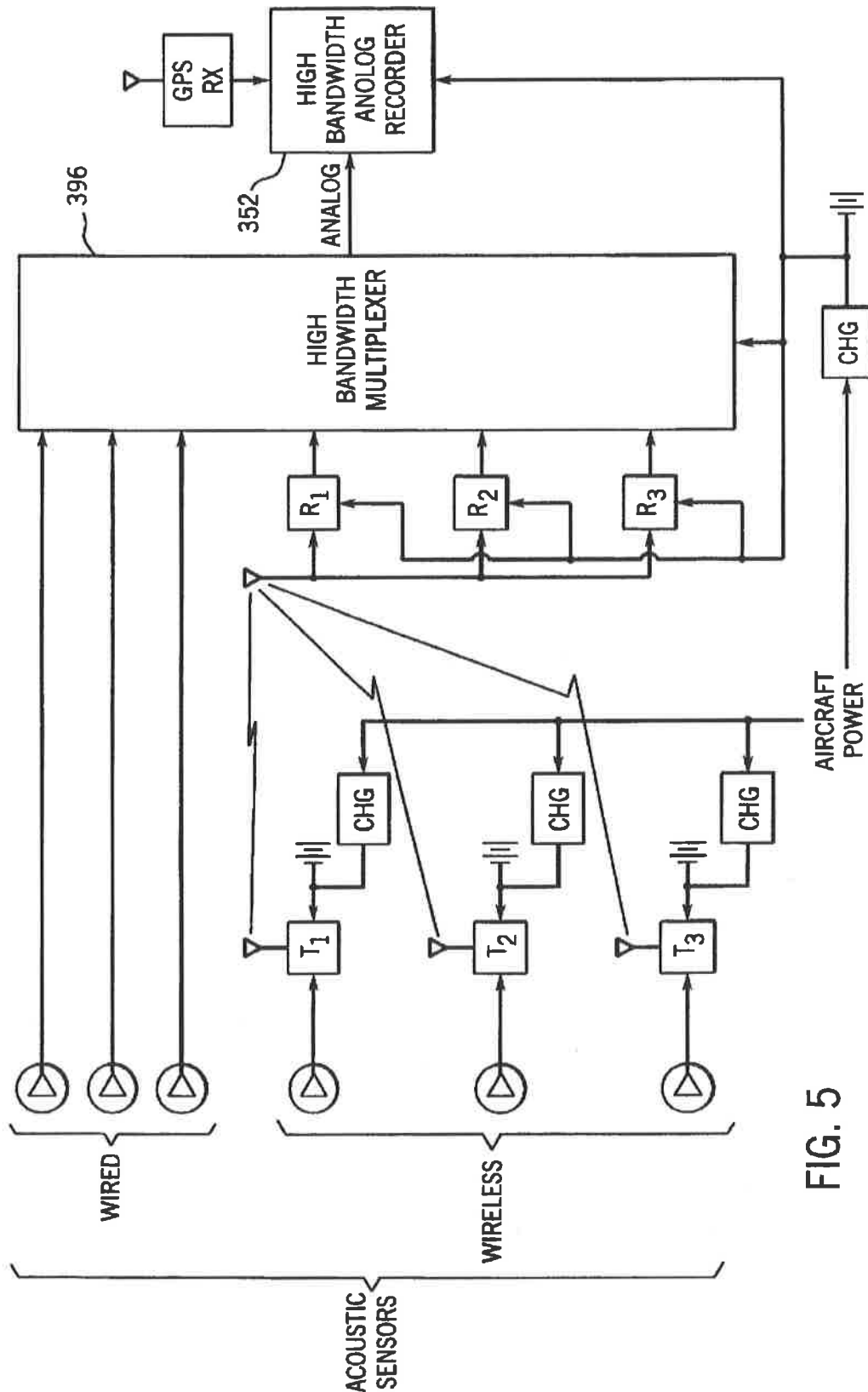


FIG. 5

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