

**United States Patent** [19]

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**Hedges et al.**

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[54] **DIRECT DIGITAL AIRBORNE PANORAMIC CAMERA SYSTEM AND METHOD**

[75] Inventors: **Thomas M. Hedges**, Great Falls, Va.;  
**David G. Weir**, Ormond Beach, Fla.;  
**Jerry A. Speas**, Pleasanton, Calif.

[73] Assignee: **Omni Solutions International, Ltd.**,  
Vienna, Va.

[21] Appl. No.: **449,350**

[22] Filed: **May 24, 1995**

[51] Int. Cl.<sup>6</sup> ..... **H04N 5/33; H04N 7/18**

[52] U.S. Cl. .... **348/144; 348/61; 348/106;**  
**348/113; 348/116; 348/117; 348/145**

[58] **Field of Search** ..... **348/61, 106, 113,**  
**348/116, 117, 135, 144, 145; 364/449;**  
**395/127**

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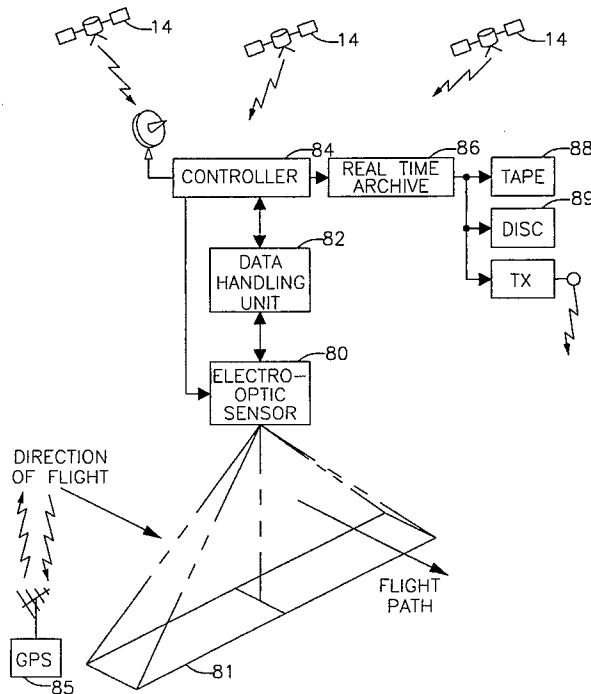
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*Primary Examiner*—Thai Q. Tran  
*Assistant Examiner*—Frank Snow  
*Attorney, Agent, or Firm*—Christie, Parker & Hale, LLP

[57] **ABSTRACT**

An airborne direct digital panoramic camera system and method in which an in-line electro-optical sensor eliminates the need for photographic film and film transport apparatus normally associated with prior art airborne reconnaissance cameras and yet still retains the very high image resolution quality which is so important in intelligence operations and commercial geographic information systems (GIS), mapping and other remote sensing applications. The system provides a simpler, more efficient and less costly panoramic camera by utilizing a lens in conjunction with the electro-optical line array sensor wherein the lens can be simpler and less expensive than a framing camera because it essentially requires quality focus in only one dimension and by eliminating the burden and delay necessitated in film processing and development. The massive amounts of digital data generated by the camera are compressed and any motion or panoramic errors are easily correctable in the digital data, while such errors were nearly impossible to correct in a cost effective fashion from film images. The compressed digital image data may be stored and retrieved later for utilization in computer type networks or alternatively can be transmitted from the aircraft to a ground station for prompt utilization.

**42 Claims, 11 Drawing Sheets**



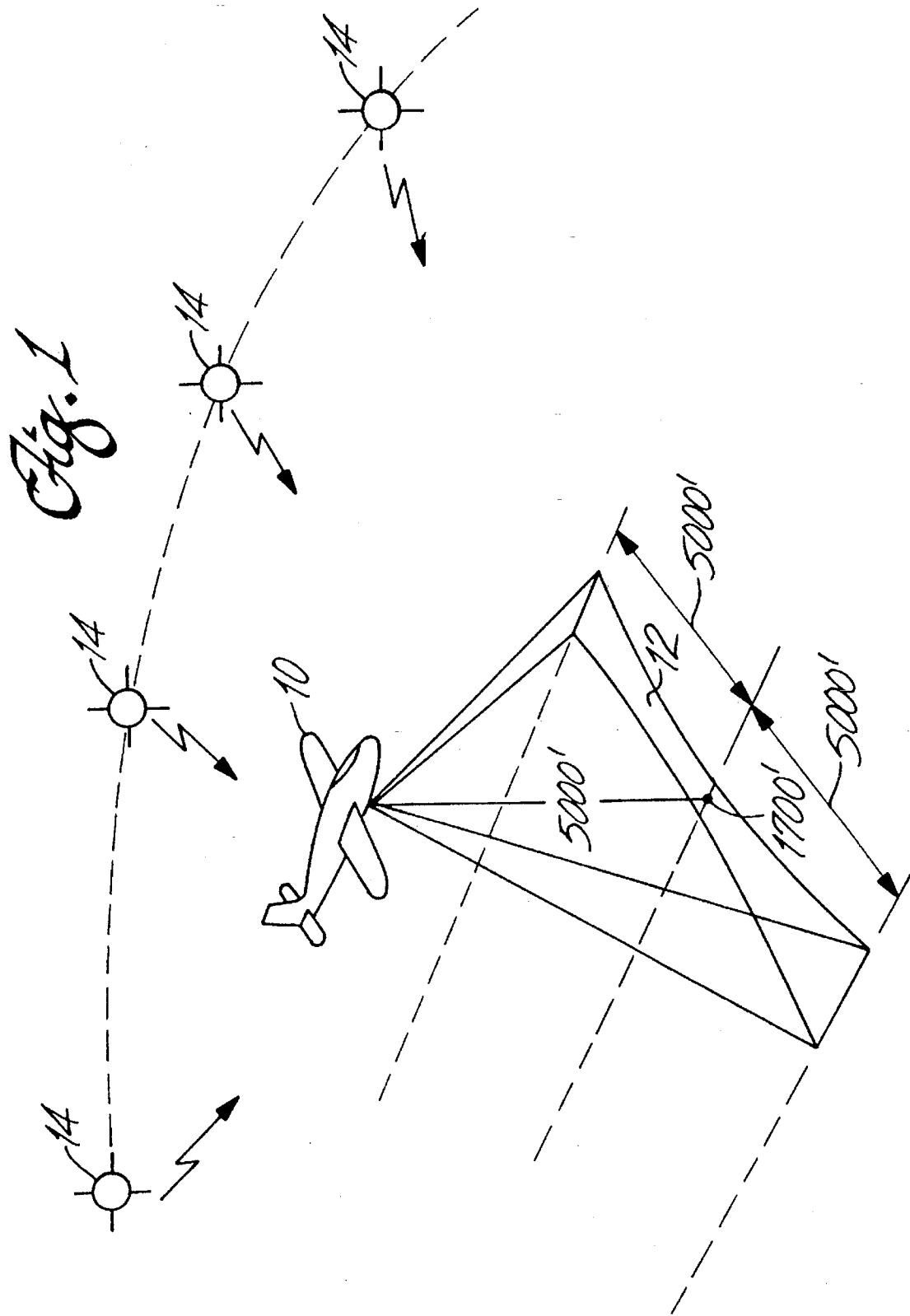


Fig. 2

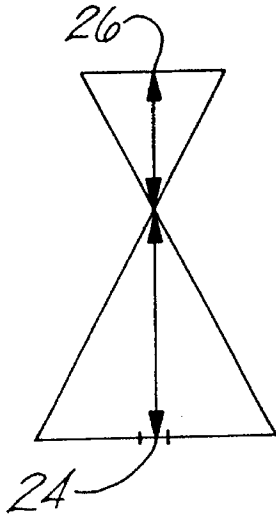


Fig. 3

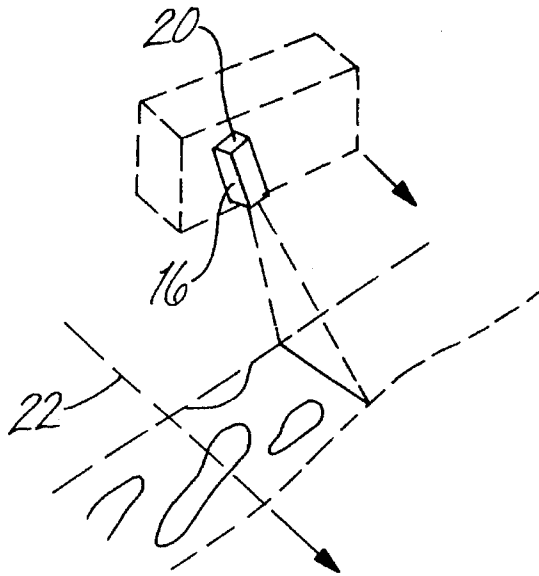
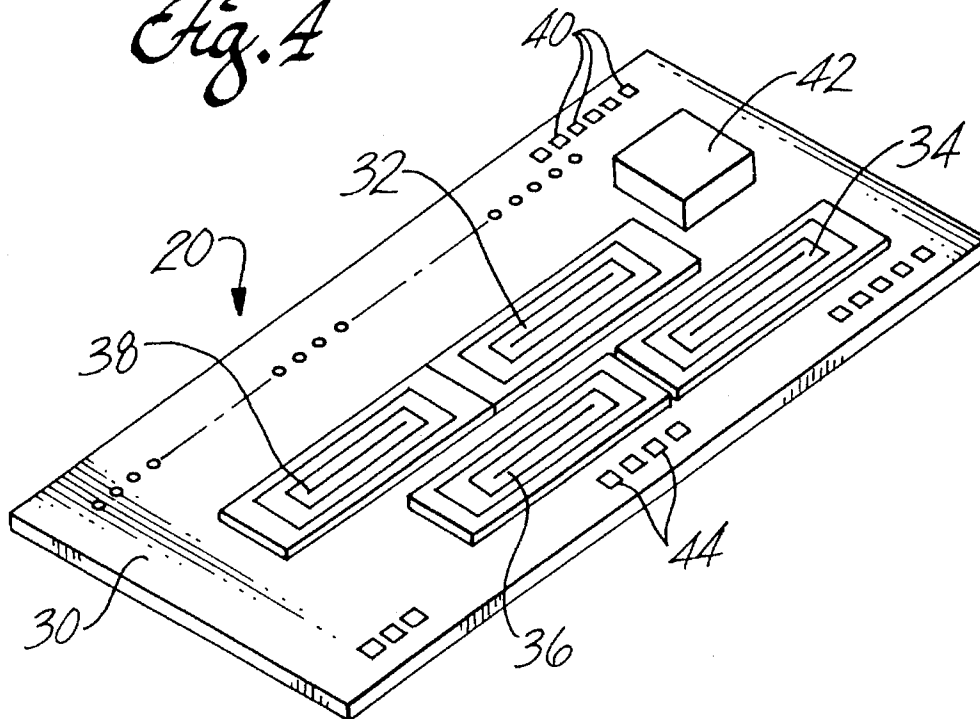
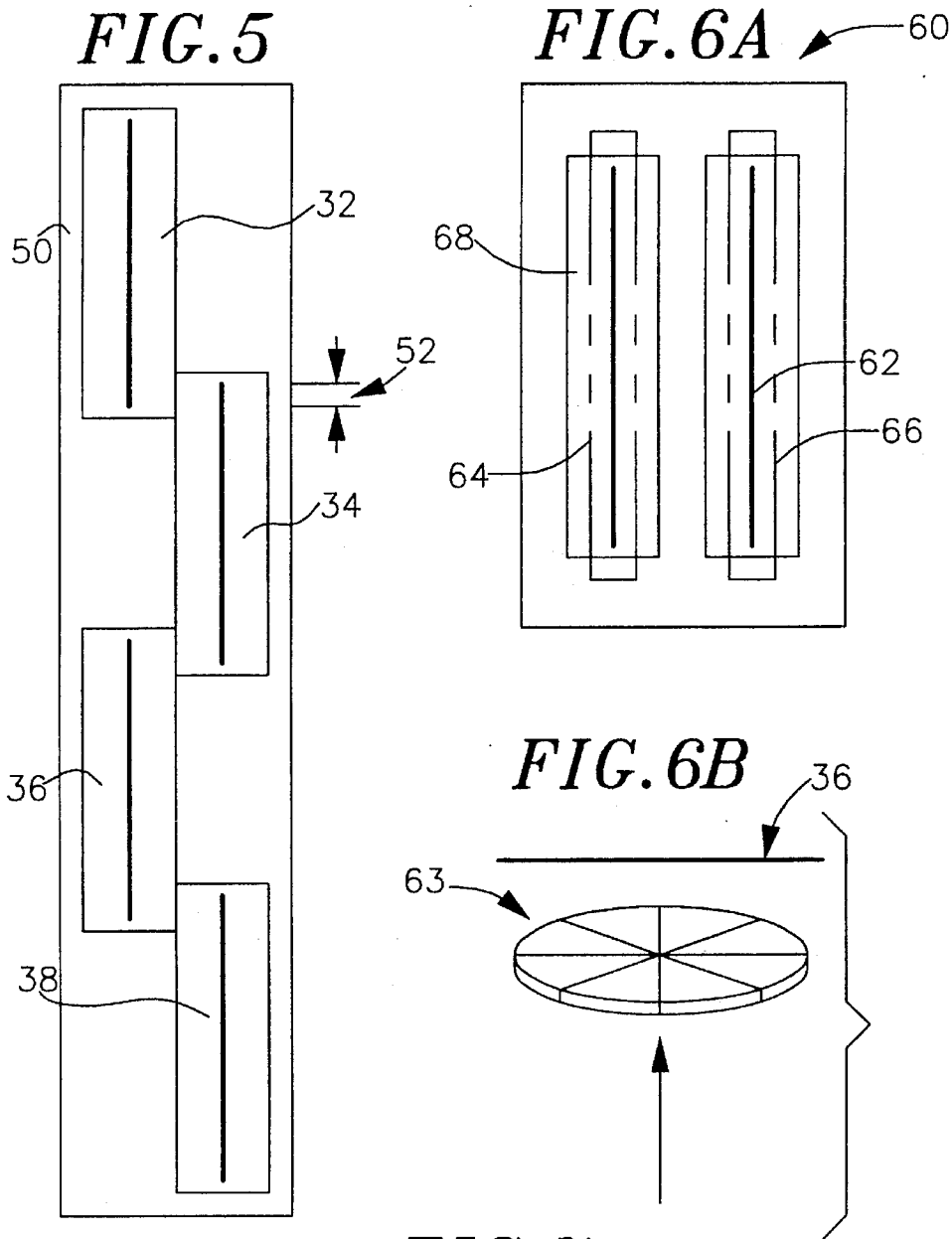


Fig. 4





**FIG. 7**

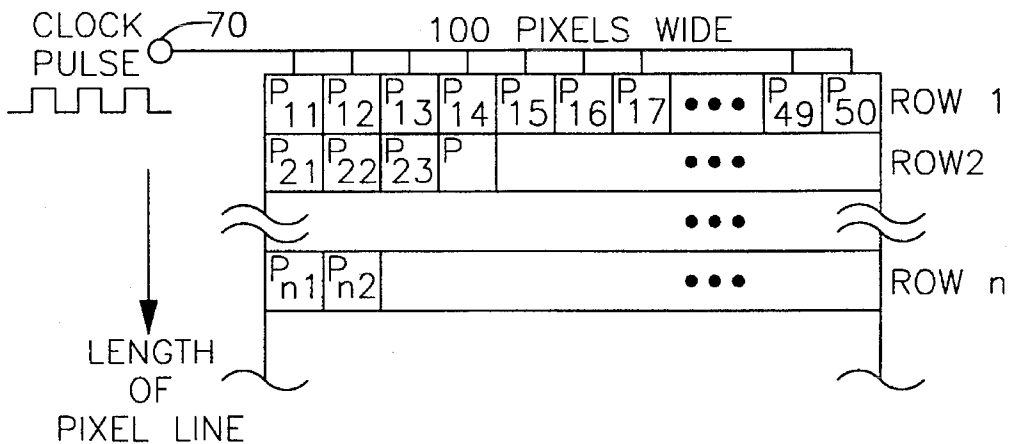
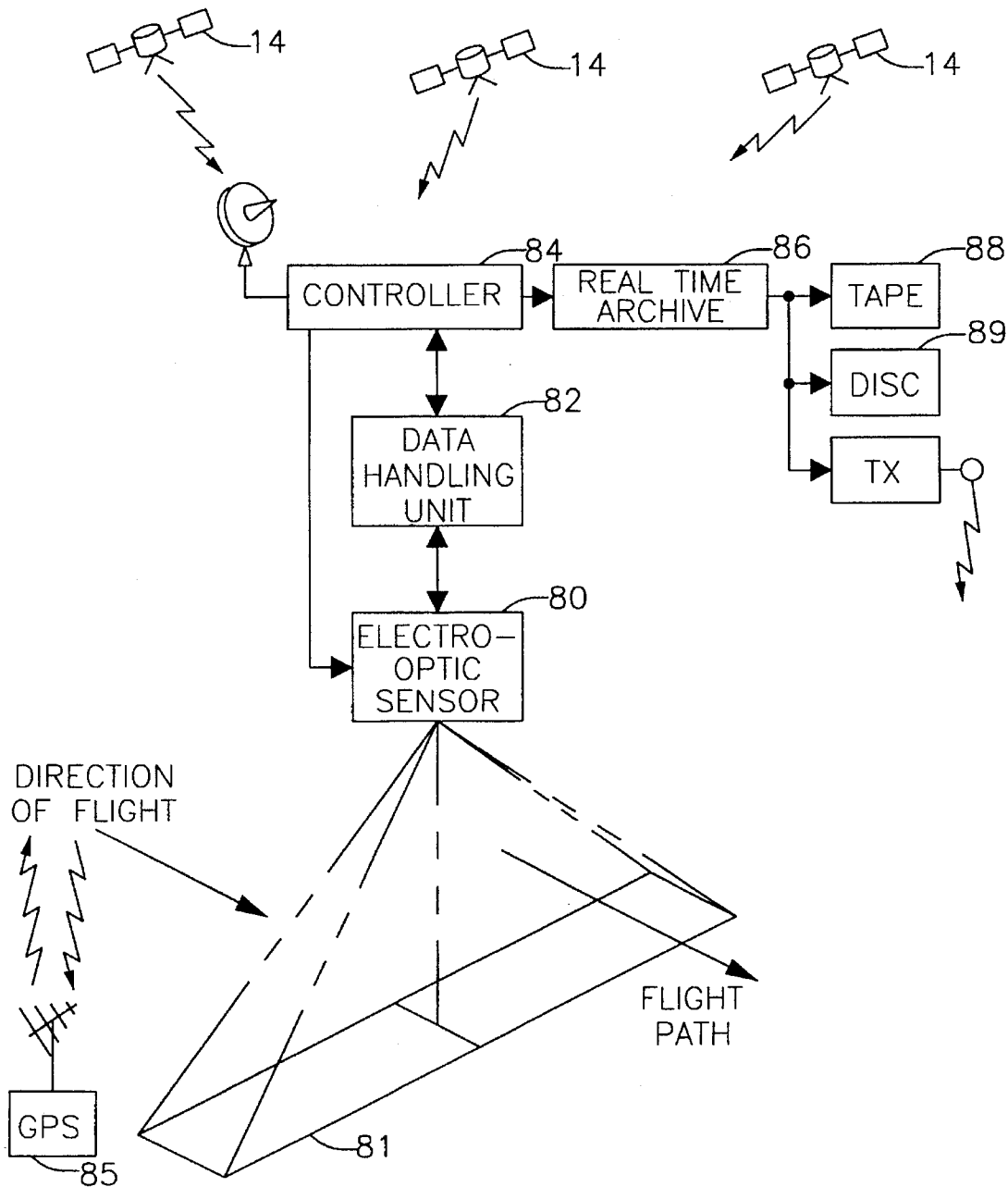


FIG. 8



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