



**VIDEO AND DATA CAPTURE AND RETRIEVAL
SURVEILLANCE SYSTEM FOR AIRCRAFT**

**Inventor:
David Monroe**



**VIDEO AND DATA CAPTURE AND RETRIEVAL
SURVEILLANCE SYSTEM FOR AIRCRAFT**

**Inventor:
David Monroe**

BACKGROUND OF INVENTION

Field of Invention

The subject invention is generally related to safety and surveillance equipment for aircraft and is specifically directed to a comprehensive multi-media safety and surveillance system for commercial aircraft wherein both data and video images may be collected, monitored, transmitted and stored.

Discussion of the Prior Art

Aircraft safety is of ever increasing importance. This is particularly true with respect to commercial airlines as more and more people and freight are moved in this manner. The airways are becoming increasingly crowded with traffic. Global tracking systems are now in place to monitor the flight of the aircraft from the moment it lifts off until it safely lands at its destination. Radar and global positioning systems are commonplace both on the aircraft and at the ground tracking stations. All of these electronic systems have increased the overall safety record of commercial traffic to new standards as the number of miles flown continues to escalate.

In addition, the on board avionics including electronic monitoring and diagnostic equipment, particularly on large commercial jets, continues to evolve, giving both the on board crew and the tracking station more complete, accurate and up to date information regarding the condition of the aircraft while in flight. Flight recorders long have been incorporated in order to provide a record of each flight and in order to provide critical information to aid in the determination of the causes of an accident or malfunction should one occur.

Even with all of this information, there still remains

a significant need to develop a system capable of providing good visual evidence of the condition of the aircraft and various components during flight. For example, even with all of the available electronic monitoring equipment, the crew of the aircraft can only make a visual inspection of a wing engine by looking out of the window. In many aircraft configurations, this requires that the crew member move into the passenger cabin in order to obtain a view of the engine. Further, with the increasing incidents of terrorism and other tampering with aircraft, a good visual surveillance system would give instant recognition of known terrorists and would provide visual inspection of critical areas and components of the aircraft while in flight, without detection by either the passengers or by possible perpetrators.

Such a system would also permit the recording of visual information to provide a visual history of the flight, further enhancing reconstruction of incidents leading to an airborne catastrophe should one occur. Visual information could also be transmitted between the ground tracking station and the aircraft, providing yet another source of information transmission for increasing the overall safety of the flight.

While such a system would be of great benefit to the airline industry in general and to the commercial airlines in particular, there are no systems currently available which meet these needs.

SUMMARY OF THE INVENTION

The subject invention is directed to a comprehensive multi-media safety and surveillance system, which in the preferred form provides both visual and audio information as well as critical data to the flight crew, and to a ground tracking station, and also permits recording the information and data generated during flight. In its preferred form, a plurality of sensor units, including at least one video image sensor/device, are placed

strategically throughout the aircraft. For example, several video cameras may be placed such that the lens of each is aimed through an opening provided in the fuselage in order to provide video imaging of the engines, tail section, and landing gear and other functional components of the aircraft. Additional cameras may be placed throughout the interior of the aircraft on the flight deck, in the cargo hold, in passenger cabin and other desired spaces. The data sensors/transducers, such as by way of example, the engine temperature sensor, oil pressure and hydraulic pressure sensors and strain gauges and the like are also incorporated in the data collection system of the subject invention.

The system may be hardwired in the aircraft, or may use wireless transmission and receiving systems. The wireless system is particularly useful for adapting the system as a retrofit on existing aircraft and also provides assurances against disruption of data transmission and collection during a catastrophic airframe failure. In the preferred embodiment, the wireless system is fully self-contained with each sensor unit having an independent power supply and where appropriate, a sensor light source. The ground communications link, monitoring and recording systems for collecting and transmitting the data are also self-contained. This assures that the system will continue to operate in the event of either a malfunction or a structural failure of the aircraft causing a disruption in power source or will not disrupt the generation and collection of data and visual images.

A monitor may be provided on the flight deck and recorders may be placed in the tail section, as is common for flight data and voice recorders currently in use. The flight deck would have instant live access to all of the images as they are captured by the video cameras and the recorder would make an historic record of the images for archive purposes. Where random access recording techniques are used, such as, by way of example, digital random access

memory storage devices, the flight deck and the ground station personnel may also be able to search and retrieve stored information. For example, current hydraulic pressure of a component may be compared with the pressure of a past point in time to monitor rate of change.

Where desired, ground tracking or control stations would have selective access to the images on a near or real time basis. In addition, the ground station could send video images to the aircraft flight deck monitors on a selective basis. That is, the ground tracking station will have the capability of interrogating the in flight data, including video images, while the aircraft is in flight. Near real time data can be received and historical data can be retrieved, as well, when the random access storage device is utilized.

The plurality of sensors are synchronized through an on board multiplexing system whereby the plurality of data, including visual image data, may be displayed, recorded, and/or transmitted in either a split screen or serial fashion. In the preferred embodiment, the system is adapted for incorporating the data signal generated by the aircraft navigational data such as that provided by a global positioning system (GPS) for tracking the altitude, latitude and longitude coordinates synchronized with the collected data in order to provide accurate information of where the aircraft is in its flight plan when an incident occurs. A time or chronology signal may also be incorporated in the data scheme. Any signal which is capable of being captured and stored may be monitored in this manner. By tying each of the images to a reference such as the GPS signal or a clock, the retrieval of data and reconstruction of an on board incident is facilitated. Utilizing the wireless system of the invention in combination with the battery back-up power supply, it is possible to continue collecting information even after an airframe failure and a disruption in aircraft power. For example, radar images which are currently displayed on a

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.