INVENTION SUMMARY:

An acoustic sensor is a microphone or a series of microphones with corresponding electronics that are capable of detecting sound sources. The microphones convert the sound to an electrical signal. Processing these signals through computers and specialized software allows analysis of the sound components, which in turn allows the sensor to detect specific sounds surrounded by other sounds (e.g., ambient noise), identify the type of sound and provide a location of the sound source.

Researchers at Stevens Institute of Technology have developed an acoustic sensor system and a method for detecting sounds (specifically from low flying airplanes), identifying the airplane type (e.g., single-engine airplane or helicopter) and providing a location of the airplane (with geo-coordinates and altitude). This sensor is passive, which means that it is based on listening rather than transmitting any signals toward the target (like radar, for instance). The method used for the sound localization is based on the difference in the time of arrival from the sound source to various microphones. Part of this method is the selection of a minimal subset of sensors for direction of arrival finding to provide minimal location errors based on the geometry of sensor placement.

BACKGROUND:

Passive acoustic detection systems have existed for many years and have been used in the detection of various sound sources, including underwater, water surface, ground, underground and airborne targets. With the advances of electronics, computing power and storage, and advanced signal processing techniques, better systems that provide higher performance at lower cost became possible. Researchers at Stevens Institute of Technology have been taking advantage of these advances and have been improving acoustic sensing to create a detection system with a lower cost, lower power consumption, lower false alarm rate and higher detection distance.

MARKET APPLICATIONS:

• Detection, tracking and classification of low flying aircraft
• Detection, tracking and classification of ground targets like vehicles, snow mobiles, motorcycles and operating machinery
• Detection, tracking and classification of water surface targets, such as small boats and jet skis
• Border and port protection applications

ADVANTAGES:

• Low cost, low power and low false alarm rate
• Passive system making it hard to detect
• Small footprint
• Easy integration with other sensors to provide better detection capabilities and add classification capability to other sensors
• Wireless capability for transmitting target information (over radio, cell phone network or satellite link)

STAGE OF DEVELOPMENT OR FUTURE WORK: Provisional Filed

KEYWORDS: Passive Acoustic Sensor, Low Flying Aircraft, Border Protection

IMAGES FOR EACH PATENT: