

Electrical Engineering; Signal Processing

Title: ***Three-Dimensional Location Estimation using Multiplicative Processing of Sensor Measurements***
UMD18-11

Inventors: ***Dayalan Kasilingam, Matthew Curtis, Murilo Silva***

Applications:

- Improved determination of range and angular position for use in:
 - Radar systems
 - Collision avoidance systems
 - Wireless communications

Benefits:

- Provides more compact, lighter systems suitable for use on ships, satellites, other mobile platforms; can be implemented in new or existing systems.
- Enables fine resolution object detection, allowing for significantly lower bandwidth and/or significant reduction of sensor elements
- Reduces the instantaneous bandwidth required for higher frequency hardware components
- Provides significant cost savings over other methods of high definition detection

Technology Description: The invention is based on a newly developed algorithm that can enable a more efficient determination of range and angular position in a wireless object-detection and classification system, which has the potential to achieve up to sub-millimeter resolution of three-dimensional position measurements. The algorithm is based on a multiplicative processing technique that reduces the number of frequency measurements needed for range determination, thereby leading to enhanced efficiency and commensurate cost and resource savings, in terms of bandwidth and hardware complexity. The algorithm has also been used to develop a method for use in angular position determination, providing enhanced resolution when using an array of sensors with a lower quantity of sensor elements. These methods can allow the use of electromagnetic or acoustic signals to measure short distances, e.g. for use in collision-avoidance systems. Other potential applications include use in radars by the defense industry; use by the wireless communications industry to allow more precise location of cell phone users; and in medical devices, to measure bodily systems more accurately over small distances.

Patent Status: A PCT patent application has been filed on this invention.

For more information: David J. Glass, Ph.D.
University of Massachusetts Dartmouth
Office: 508-910-9815
Cell: 617-653-9945
dglass@umassd.edu
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