Radio Frequency Identification Tags - Active Tags

Battelle Number(s): 12329-B; 14423-B; 14169-B; 14170-B; 14234-B
Patent(s) Pending
Available for licensing in some fields

SUMMARY

PNNL's active radio frequency (RF) tags are true transmitters of information. Powered by a battery, these miniature electronic "tags" can initiate communication with monitoring networks and interfaces. Active RF tags can be read and updated from up to hundreds of meters away. In addition to helping locate items, these systems can be used to monitor temperature, humidity, pressure, shock, leakage, and other data that could help determine the physical condition of the items being tracked or monitored.

ADVANTAGES

- Initiates transmission at any time, without being activated first by a reader or interrogator
- Reads, updates and receives data from tags at distances as great as hundreds of meters
- Connects to multiple sensors to monitor inputs such as temperature or pressure
- Controls outputs such as valves and switches
- Has built-in decision-making ability; for example, to automatically deactivate a piece of equipment if a temperature threshold is exceeded
- Has the ability to read, update, or actively transmit information from multiple tags nearly simultaneously -- at a rate of about 50 tags per second
STATE OF DEVELOPMENT & AVAILABILITY

- We're developing complete RF systems that include predictive sensors and transmit data using existing cordless and cell phone technology. We have built networks of RF tags and predictive sensors to collect and evaluate data in real time. Sensor systems such as these could be installed on engine components for remote monitoring and real-time assessments of equipment condition. In another potential application, fruit growers could install an active RF tag and sensor system in a cherry orchard and be notified automatically when temperatures fall dangerously low for the crops. Our two newest tags include:
  - Beacon Tag: moderate read-range that significantly helps overcome packaging range induced limitations
  - Inexpensive one-way communication link
  - Transmit periodically or on sensed condition - easily modified to fit application
  - Small size allows tags to easily fit in a badge holder
  - Personal identification
  - Sensor monitoring and reporting: Temperature, humidity, and conductivity - switch open/closed, etc FlexiTag™ a small bendable/flexible active RF sensor tag
  - Flexible external sensor/computer interface
  - Onboard signal processing and data analysis
  - Time-stamped, nonvolatile data logging
  - Real-time data collection mode
  - Multi-year, compact, efficient data storage
  - Selectable, license free, RF frequency bands
  - Ultra low power sleep mode
  - Miniaturized, encapsulated bendable packaging
  - Great for asset, environmental, process control, and health monitoring
  - GPS and Dead Reckoning
  - Mesh Networking (Tag-to-Tag) Sensor Communications

PATENTS & INTELLECTUAL PROPERTY

- 6,889,165

TECHNOLOGY PORTFOLIO(S)

- Electronics
POTENTIAL INDUSTRY APPLICATION(S)

- Aerospace & Defense
- Agriculture & Mining
- Automotive & Transportation
- Chemicals
- Communications & Media
- Computers & Electronics
- Consumer Products
- Energy & Utilities
- Entertainment & Recreation
- Fabric & Apparel
- Food, Beverage & Tobacco
- Healthcare, Pharma, Biotech & Medical
- Manufacturing & Warehousing
- Oil & Gas
- Professional Services
- Public Administration & Government
- Recycling & Waste Management
- Security
- Wood, Paper & Forestry

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