



## Sensors

# RFID Inventory Management System

RFID technology to quantify and track liquids and bulk goods

**NASA's Johnson Space Center** developed a Radio Frequency Identification (RFID) Inventory Management System (IMS) to monitor and track items that are too small to tag on an individual item level. Although RFID technology is being used widely for pallet and box-level tracking in the commercial sector, significant technology gaps remain for tracking dense quantities at the item level. This system uses RFID circuits to identify the fill level in a container and could be easily converted for use in industries such as individual health care management, pharmaceutical manufacturing and distribution inventory tracking, retail and supply chain inventory management. Use of this technology enables the manufacturer, distributor supplier or user to easily manage and control an inventory of small items that are difficult to tag such as bulk grain foods, liquids, pills, mechanical parts (nuts, bolts, and washers) and small electronic components.

## BENEFITS

- Improved inventory management and control—identify, track and quantify small items in large containers that are not suitable for individual item tagging
- Adaptable—can be used to communicate with inventory management software and dispensing mechanical or robotic systems
- Cost effective—uses inexpensive passive RFID tags to augment existing optical scanning (barcode-based) inventory management systems
- Widely applicable—used to track any type of item that is challenging to tag, making it suitable for an array of commercial fields

technology solution

# NASA Technology Transfer Program

Bringing NASA Technology Down to Earth

## THE TECHNOLOGY

The RFID IMS comprises four major components: RFID circuits, a wave guide antenna distributor, a tagged container, and an interrogator/reader. The system uses passive RFID circuits placed on a bulk item container to track consumption and quantify items as the items are removed, added or replaced in the container. The antenna is strategically placed on the lid or attached above the container and is constantly sending an inquiry signal to the RFID circuits. The circuits reply with information regarding the fill level in the container. This information can then be read by an interrogator for tracking and inventory management. This setup can be modified to track all kinds of items making this technology suitable and applicable to an array of commercial fields.

RFID is a disruptive technology that has made a large impact on several industries, especially in supply chain and asset management. According to market research, the global market for RFID products and services was \$6.3 billion in 2010 and it is expected to grow at an annual rate of 12.1 percent. The RFID Inventory Management System is well positioned to tap into this growing market. Its ability to account for liquids and bulk goods that were deemed impossible to tag makes this technology relevant for an array of applications and industries.



The NASA developed technology can be used to track medication and other items found in hospitals and/or residences.

## APPLICATIONS

The technology has several potential applications:

**Pharmaceuticals** – applicable to items difficult to tag such as drugs, medicine in liquid form, tablets, and other small medical items that would otherwise be difficult to manage

**Health care** – can be used by healthcare providers to monitor medication and other health care-related items in hospitals, nursing homes and/or residences

**Consumable supply management** – able to track consumable items in a variety of industries such as manufactories and retail

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