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# Electronic Cargo Tracking

*An RFID based technology*

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## OpenWorks **LOGISTICS**

*Technical Specification V1.0.2*

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## Contents

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1. CONTENTS .....	2
2. RFID TECHNOLOGY.....	3
3. SOLUTION DESCRIPTION.....	5
4. POTENTIAL BENEFITS .....	6
5. CONCLUSION .....	6

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Version 1.0.0 published on September 27, 2004

Last updated on February 18, 2005

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## RFID Technology

[Back](#)

Radio Frequency Identification (RFID) is an Identification technology used for contact less way of automatic data collection where an RFID Reader reads information in a tag.

Texas Instruments Radio Frequency Identification (TI-RFID™) Systems is an industry leader in radio frequency identification (RFID) technology and the world's largest integrated manufacturer of RFID tags, smart labels and reader systems.

With more than 400 million tags manufactured, TI-RFID technology is used in a broad range of applications worldwide including access control, automotive, document tracking, livestock, product authentication, retail, sports timing, supply chain, ticketing and wireless payment.

The commercial use of RFID appeared in the form of Electronic Article surveillance (EAS) in the mid 1960's, and then the application was extended to the areas of Access control, Animal tracking, Vehicle tracking and factory automation applications.

With the growing applications of RFID into the Supply Chain Automation, Material Handling System, Warehouse Management System, etc. the need for the demand from the manufacturers to develop systems that support various decision support systems enable large corporate companies to foray into the RFID arena.

Thus RFID technology can be taken as the next evolutionary step in the Automatic Identification technology. It integrates the digital world with the physical world by seamlessly connecting the objects of the physical world.



## **RFID System Components**

RFID systems have several basic components or technical characteristics that define them. Some of the components that constitutes a RFID system includes

1. Transponder or Tag
2. Reader or Interrogator
3. Antenna
4. Software

### **Transponder**

The transponder consists of a microchip attached to an antenna and is placed in the object or entity to be located. These tags generally are of passive form, which don't have any power source or batteries into it. Based on the memory design the tag can be of various type like RO (Read Only), RW (Read/Writable), etc.

### **Reader**

The reader is a device that does the communication from and to the transponders through radio waves. Some readers have the antenna integrated into it and others have provisions to connect external antennas for increased read range.

### **Antenna**

The Antenna forms a part of the RFID reader and it takes a variety of shapes. The antenna is used to transmit and receive the radio waves in the form of RF signal between the reader and the tag along with the data.

### **Software**

The software acts as a middleware between the RFID systems and the Enterprise applications. The data captured by the reader is converted into a format that is perceivable by the system. OpenWorks series of software acts as a middleware between hosts of applications.



## Solution Description

[Back](#)

### Cargo Tracking

RFID can be used to identify and track the cargo in transit from one location to another.

Tracking can be done at the following levels:

1. Item Level
2. Pallet Level



**Pallet Level Cargo Tracking**

#### 1. Item Level

In Item Level Tagging, the RFID transponders are affixed to the tracking objects or the materials and the movements of the items are tracked using handheld or stationary RFID readers.

#### 2. Pallet Level

Pallet level tracking enables multiple items to be read at once. This requires a lot of parameters taken into consideration. Some of them include non-line of sight, which is available with RFID systems but is not available in other auto id systems like barcode.

RFID also includes many features like any orientation reading which enables that the items can be read in any orientations and provision for simultaneous identification of the pallets. Thus multiple items can be read at once even if the objects are in motion. The items can be still tracked even if the objects are moving at a rate of 2 meters per second.



## Potential Benefits

[Back](#)

The RFID system will raise productivity by increasing the number of pallets handled daily and guaranteeing the validity of information about material movement. The following are some of the advantages RFID excels over other auto id technologies like barcode.

### Advantages & Benefits:

- ✓ RFID creates real time information links that speeds tracking, improve quality and streamline delivery.
- ✓ Items can be read at any Orientations
- ✓ Non- Line-of-Sight Technology
- ✓ Multiple packages can be read simultaneously
- ✓ Objects can be read even if they are in motion (2m /sec)
- ✓ Read/ Write capability
- ✓ Data can be updated on the fly
- ✓ Unique ID of the RFID transponder prevents counterfeiting
- ✓ RFID readers and transponders are ISO 15693 compliant this allows a open system design considering the future expand abilities

## Conclusion

[Back](#)

Thus RFID excel in the arena of security, speed and the data updating parameters when compared with the traditionally available systems of tracking cargo. This enables the system to be error free and expandable to any level based on the requirement specification. These make RFID one of the next generation automatic identification technologies for a wide range of businesses and industries.