



Original Contribution

A RFID APPLICATION ABOUT HEALTH INFORMATION MOBIL APPLICATION: VERICHIPS

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ABSTRACT

Identification is a powerful capability, useful in classifying, counting, and organizing objects. Radio frequency identification (RFID) is a means of identifying objects by interrogating a unique characteristic of the object (such as a unique identifying number stored on a silicon chip attached to the object) using radio waves [1].

VeriChip is an application that assembled on passive RFID tag principles. The tiny chip, which costs about \$200, is injected under the skin of the arm in a minimally invasive procedure that takes less than 20 minutes [3]. The VeriChip, developed by Applied Digital Solutions, of Delray Beach, Fla., could help many of these patients. VeriChip's goal is to become the leading provider of RFID systems for people in the healthcare industry. VeriChip sells passive RFID systems for identification purposes and active RFID systems for local-area location and identification purposes [2].

Key Words: Radio frequency identification, VeriChip

INTRODUCTION

To understand RFID technology characteristics one must first understand just what is RFID₁. RFID (Radio Frequency Identification) is a means of Storing and retrieving data through electromagnetic transmission to an RF compatible integrated circuit [8].

Certainly, there are several identification types; bar codes, finger prints, thermal identification, password, etc. but advantage of RFID identification is non-contactless technology. At this technology, person, who is tried to identify, doesn't have to contact anything.

INTRODUCTION TO RFID

RFID is an area of automatic identification

that is gaining momentum and is considered by some to emerge as one of the most pervasive computing technologies in history. In its simplest form, RFID is a similar concept to bar coding. It is seen as a means of enhancing data processes and is complementary to existing technologies. It is a proven technology that has been in use since the 1970s [4].

RFID is used for a wide variety of applications ranging from the familiar building access control proximity cards to supply chain tracking, toll collection, vehicle parking access control, retail stock management, ski lift access, tracking library books, theft prevention, vehicle immobilizer systems and railway rolling stock identification and movement tracking [4].

BASIS OF RFID

One of the earliest papers exploring RFID is a landmark paper by Harry Stockman "Communication by Means of Reflected Power" published in 1948. This came on the heels of the radar and radio research undertaken during the Second World War [4].

A typical RFID system can use the principle of modulated backscatter (see Fig. 1). In this type of RFID system, to transfer data from the tag to the reader, the reader

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sends an unmodulated signal to the tag. The tag reads its internal memory of stored data and changes the loading on the tag antenna in a coded manner corresponding to the stored data. The signal reflected from the tag is thus modulated with this coded information [5].

Sometimes even kill them (1). Recently the other mechanisms of antagonism have been also intensively studied.

The aim of present study was to determine the antibacterial activity of original Bulgarian dairy lactobacilli against clinically important test cultures and isolates.

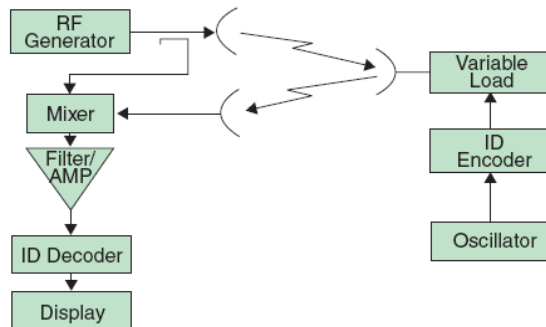


Figure 1. Functional blocks for reading data from a backscatter RFID tag. The reader is on the left, and the tag is on the right [5].

TYPES OF RFID TAGS

There are two types of RFID tags, these are passive and active tags. Passive tags do not have a battery. These tags provide the energy from readers' electromagnetic transmission.

But the active tags have a battery for supply energy. Active tags (fig. 2) can be read farther than passive tags. VeriChips based on passive tags principle.

RFID ARCHITECTURE

The RFID system architecture consists of a reader and a tag (also known as label or chip). The reader queries the tag, obtains information, and then takes action based on that information.

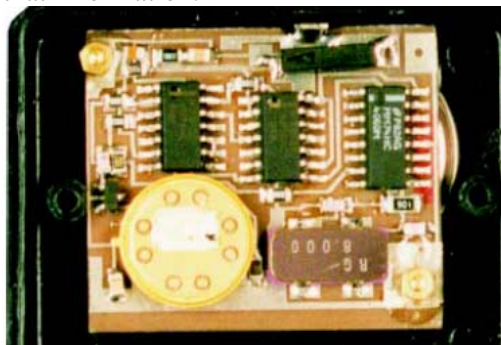


Figure 2. Active RFID tag

PASSIVE RFID TAGS

Passive RFID tags do not contain a battery or other power source; therefore, they must wait for a signal from a reader. The tag contains a resonant circuit capable of absorbing power from the reader's antenna. Obtaining power from the reader device is done using an electromagnetic property known as the Near Field. As the name implies, the device must be relatively near the reader in order to work. The Near Field briefly supplies enough power to the tag so that it can send a response [9].

READER

Usually a microcontroller-based unit with a wound output coil, peak detector hardware, comparators, and firmware designed to transmit energy to a tag and read information back from it by detecting the backscatter modulation.

TAG

An RFID device incorporating a silicon memory chip (usually with on-board rectification bridge and other RF front-end devices), a wound or printed input/output coil, and (at lower frequencies) a tuning capacitor (fig. 4).

The RF field generated by a tag reader (the energy transmitter) has three purposes:

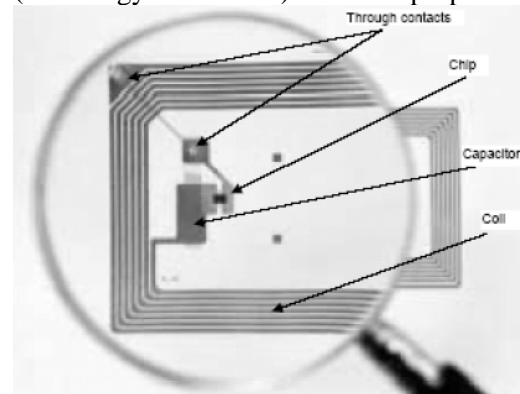


Figure 3. Components of a passive RFID tag.

Most RFID systems can simultaneously capture data from many tags within range of the antenna. Some are capable of capturing tag identification codes at a rate of up to 1,000 tags per second. The reading distance range of the reader depends on the number of antennas used, antenna size, and frequency (Table 1) [10].

Table 1. RFID reader distance range.

Frequency Band	Description	Range
125-134 KHz	Low frequency	To 18 inches
13,553-13,567 MHz	High frequency	3-10 feet
400- 1000 MHz	Ultra High frequency	10-30 feet
2,45 GHz	Microwave	10+feet

VERICHIPS

VeriChip is a subsidiary of Applied Digital and provides state-of-the-art RFID security solutions that identify, locate, and protect people, their assets, and their environments.

From the world's first and only FDA-approved, human-implantable RFID microchip to the only RFID tag with patented skin sensing capabilities, VeriChip's technology ensures the safety and security organizations are looking for. Its market-leading infant protection, wander prevention, asset tracking, and patient identification applications make VeriChip the predominant RFID solutions provider in the healthcare industry [12].

ABOUT APPLIED DIGITAL SOLUTIONS

Applied Digital is the parent company of VeriChip Corporation. Applied Digital develops innovative identification and security products for consumer, commercial, and government sectors worldwide. Through Applied Digital's affiliates, the company offers unique and often proprietary products provide identification and security systems for people, animals, the food supply, government/military arena, and commercial assets. Included in this diversified product line are RFID applications, end-to-end food safety systems.

ABOUT VERICHIP CORPORATION

VeriChip Corporation, headquartered in Delray Beach, Florida, develops markets and sells radio frequency identification, or RFID, systems used to identify, locate and protect people and assets. VeriChip's goal is to

become the leading provider of RFID systems for people in the healthcare industry. VeriChip sells passive RFID systems for identification purposes and active RFID systems for local-area location and identification purposes. VeriChip recently began to market its VeriMed Patient Identification System which is used to rapidly and accurately identify people who arrive in an emergency room and are unable to communicate [13].

TAGS, USED BY VERICHIP'S

Tag components are the antenna coil, the capacitor, the microchip, the connections, a protecting gel, the bioglass cylinder and the parylene coating (Fig. 4).

These tags are equipped with a single antenna, therefore they transmit and receive their information and energy at different times [15]. The antennas have a ferrite core, which is surrounded by a cylindrical wire-wound copper coil. The ferrite core gives the highest charge-up field [16].

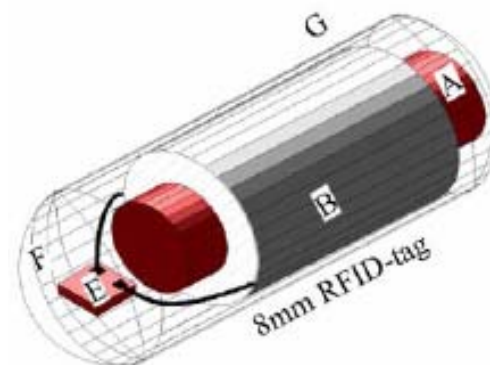


Figure 4. Tag components, drawing of an 8 mm RFID-tag, A. Ferrite core, B. Antenna coil, E. Microchip, F. Bioglass capsule, G. Parylene coating, the fragile connections between the antenna coil, the board and the microchip are also visualized. The different tag parts are surrounded by a rigid rotecting gel [16].

VERICHIP SOLUTIONS ABOUT HEALTHCARE

IMPLANTABLE APPLICATIONS

An integral part of VeriChip's RFID healthcare solutions is VeriMed, the first and only patient identification system that uses an implantable microchip to "speak" for patients if they are unconscious or unable to communicate in an emergency situation.

About the size of a grain of rice and inserted just under the skin in the right tricep, each VeriMed microchip contains a unique 16-digit identification number that emergency personnel can scan to immediately identify a patient and access their personal health information — facilitating appropriate treatment with less delay (fig. 5). VeriMed provides the right information at the right time.



Figure 5. Rapid identification with hand reader.

PATIENT IDENTIFICATION

VeriMed, using the world's first and only patented, FDA-approved, human implantable RFID microchip, offers rapid, secure patient identification to help at-risk patients get the right treatment when needed most.

WANDER PREVENTION

VeriChip's wander prevention systems are installed in over 4,000 long-term care facilities, helping provide residents with the mobility they deserve while preventing them from wandering out of designated areas.

INFANT PROTECTION SYSTEM

VeriChip is behind the two top infant protection system brands in the industry, **Hugs** and **HALO**, offering hospitals the best possible prevention of infant abductions and accidental mother-baby switching [13].

HALO Infant Protection System

Any unauthorized attempt to remove the HALO tag, or to take the infant through a monitored exit, immediately results in an alarm at the HALO computer identifying the infant and the exact location.

The tag pulse feature of the tag also means that each infant is being monitored at all times. If the system does not receive any

messages from the tag for a certain period, an alarm is automatically generated. The distributed intelligence of the HALO system ensures that your facility is protected even when the unexpected occurs, like a problem with your hospital network. Door and elevator controllers continue to monitor for HALO tags, and will alarm if someone tries to remove an infant [14].

HUGS INFANT PROTECTION SYSTEM

Here's how the Hugs system works. Every infant in your unit wears a Hugs tag with a unique ID number on the ankle, and every exit point is electronically monitored to detect the tags. This means staff and family can move infants freely within the protected zone, but no one can remove an infant from the unit without your staff being alerted.

Beyond this superior and active supervision of infants, the Hugs system monitors its own functionality and alerts staff of any problems [14].

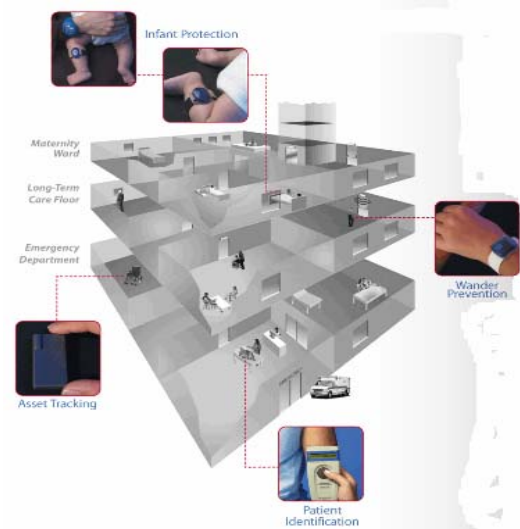


Figure 6. In a hospital Verichip's application

ACCESS CONTROL

With VeriChip's patented, FDA-cleared, human-implantable RFID microchip technology, access control has achieved a new level of protection never offered before. Now, organizations can protect entire buildings, floors, or designated areas with the highest level of security available today and easily incorporate this into existing building control systems. Additionally, staff, visitors, and even assets can be tracked within the facility in real-time.

VERICHIP'S IN MILITARY AND GUN MARKETS

Implantable passive rfid tags syringe the soldier's hand. Rfid reader is assembled to gun's butt. Gun's ignition mechanism must activate only rfid reader. Every gun's reader only activates rfid tag in soldier's hand. So, nobody else don't use gun. If already gun stolen, nobody don't use without rfid tag.

This application doesn't use only in military. It can use civilian life. If a person wants to sell a gun, rfid tag syringes his hand (fig. 10) so only that person can use gun and unlicensed guns can't be use. So, unlicensed gun using rate will be fall down.



Figure 7. A Rfid Tag Putting In A Hand

RFID CHIPS INSTEAD OF CREDIT CARDS

Near future time, rfid tags can be used every identity places. One of them is instead of credit card. Biggest problem about credit card is getting stolen and losing the cards. But implantable rfid chips can be used instead of credit card. So, getting stolen and losing problem will disappear.

SECURITY PROBLEMS

One of the papers exploring about RFID viruses is by Melanie R. Rieback, Bruno Crispo, Andrew S. Tanenbaum "Is Your Cat Infected with a Computer Virus?" Published in 2006. They explained that there are a number of well-established RFID security and privacy threats. These are;

1. Sniffing, 2. Tracking, 3. Spoofing, 4. Replay attacks, 5. Denial of Service [19].

Another theory about RFID attacks is "RFID security" book, written by Frank Thornton and his friends. They explain RFID attacks in this book.

1. tag encoding attacks, 2. tag applications attacks, 3. securing communications using RFID attacks[11].

CONCLUSION

The technology is being used by a number of

major organisations and is on the brink of widespread applications in logistics, transport, manufacturing, distribution, retail, safety, security, healthcare, law enforcement and many other areas [18]. The expanding industrial interest in the use of RFID and the increasing tangibility of the prospects of these commercial applications reinforce the need for collaborative efforts by regulators worldwide to smooth the uptake of the technology by helping to clarify where the significant legal obstacles lay.

RFID is a new technology, so some security problems are there. But we hope that these problems will correct.

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