Chapter 3.7
Radio Frequency Identification Technology in Digital Government

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INTRODUCTION

Following technical strides in radio and radar in the 1930s and 1940s, the 1950s were a period of exploration for radio frequency identity (RFID) technology as shown by the landmark development of the long-range transponder systems for the "identification, friend or foe" for aircraft. Commercial use of RFID appeared in the 1960s, such as electronic article surveillance systems in retail stores to prevent theft. The 1970s were characterized by developmental work resulting in applications for animal tracking, vehicle tracking, and factory automation.

RFID technology exploded during the 1980s in the areas of transportation and, to a lesser extent, personnel access and animals. Wider deployment of RFID tags for automated toll collection happened in the 1990s. Also, there was growing interest of RFID for logistics and having it work along side with bar codes. In the beginning of the 21st century, the application of RFID technology has been ubiquitous and now it is practically part of everyday life (Landt, 2001).

BACKGROUND

Similar to bar coding, RFID tags provide information about goods, products, conveyances, animals, and people in transit. However, unlike bar coding which tracks product lines, RFID technology uses radio frequencies to automatically detect individual units and the information about these units. Use of radio frequency eliminates line-of-sight requirements and permits wireless detection.

RFID offers a number of advantages over the current bar-code technology which uses universal product codes (UPC). Codes in RFIDs are long enough so that each tag may have a unique code whereas a specific line of products are limited to a single UPC code. The distinctive nature of RFID tags results in an object that can be individually

tracked as it moves from location to location. For product items, this characteristic can help retailers reduce theft of specific units and other forms of loss. Although functionalities provided by this technology far surpass those provided by bar coding, it does not mean that RFID will replace bar codes because of cost considerations.

RFID technology ensures better inventory control which leads to improved supply chain operations. The U.S. Department of Defense (DOD) has required its roughly 40,000 suppliers to put RFID tags on pallets and cases as well as on single items costing $5,000 or more beginning January 1, 2005. Wal-Mart has required that its top-100 suppliers provide the tags by 2005 for tracking merchandise, materiel, and goods.

RFID technology extracts information from tags, also known as transponders, wirelessly and automatically. Consider an arrangement of antennas connected to reader, which in turn is connected to a computer. When a tag enters the radio frequency field, it derives power from radio frequency signal. This energy allows a tag to transmit data, typically an identity, often in the form of an electronic product code (EPC). Unlike bar codes which tell you that a carton contains product XYZ, EPCs can specifically identify one box of product XYZ from another box of product XYZ.

This information is fed to a reader via the antenna. The reader interprets the information and translates it into binary format before relaying it to the connected computer. The computer can perform an action based on data received—this could be simply identifying existence of an item or adding or deleting it from its inventory. In some cases, the computer can also send a message back to the tag (Shahi, 2004).

RFID technology has clearly emerged as an approach to support e-government strategies aimed at improving citizen services, security operations, government-to-business interactions, and internal government operations. This article explores the potential of RFID technology in achieving quantum-level improvements in the realm of digital government particularly at the federal sector.

APPLICATIONS OF RFID

Applications of RFID technology were researched and actual and potential uses of the technology for digital government were identified and categorized into the following functions:

- Delivery of citizen services
- Security applications
- Business-to-government interactions
- Internal government operations

Applications identified were specifically those that have been or can be implemented by a government entity including the military.

Delivery of Citizen Services

Improving Drug Safety

The Food and Drug Administration is investigating attaching RFID tags onto pharmaceutical drug labels. These tags will help pharmacists and technicians find where on the shelf a drug is stored and the length of time the drug has been there. This system can also help when there are drug recalls and for verifying expiration dates (Sun Microsystems, 2003).

In another application, RFID tags are being embedded in lids of medication bottles and vials to ensure patient medication compliance. The RFID can be programmed to remind the patient when the next dose is due and tracks and records the time the patient opens the bottle to remove the tablet or capsule. The data can then be retrieved by a reader for review by the physician, researcher, or pharmacist. This approach can be applied to Veterans Administration hospitals, military hos-