Making Everything Easier!™

RTLS FOR DUMMIES®

Learn to:

- Understand what RTLS is and what it can do
- Implement RTLS (Real Time Location Systems) in your business
- Keep RTLS secure
- Recognize how RTLS differs from GPS and other locator technologies

Ajay Malik

®

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About the Author

Ajay Malik, a computer science graduate from IIT Roorkee (one of the most prestigious engineering universities in India), has over 20 patents issued and pending, many in the field of RTLS. He’s been working in the field of RFID and RTLS for more than five years.

He works with a wide range of customers, vendors, and integrators for RTLS solutions in different market segments, such as health care, homeland security, education, industrial, and so on. Not only has he been involved in architecting and creating effective RTLS solutions by interacting with customers, but he also has been leading engineering teams to deliver components or complete RTLS solutions. He championed Real Time Location System, supporting multiple technologies at his tenure in Motorola and is currently working as CTO at RF Technologies, a company that has been involved with RTLS solutions for more than 21 years.

Dedication

To the three great women and a little man who define me every day — my mother Prabha, my wife Ritu, my daughter Shanaya, and my little son Aarush.

And, to my father, whom I could not get to tell all the things I had to say. He passed away too soon.

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Introduction

R*TLS (Real Time Location System),* as the name implies, is all about location. You could buy this book because it was either present in a desired location or someone could locate it for you. Whether represented as a map, encoded as a ZIP code, labeled as a store aisle, or as any of the many other ways to represent location, people make fundamental decisions based on location. Location is a foundational information ingredient. If you need something, you need to know its location. If you want to show something, you need to put it in the right location. The ability to control or coordinate actions based on the location of things or people is fundamental. A business can set processes in place to ensure that specific assets are present in a specific location to increase sales. A professor can quickly account for a student's location at a time of distress. A business can ensure that workers can find shared equipment to prevent time wasted in searching for it. A paramedic can reach the trapped miner by taking the shortest route. A nurse can find the defibrillator in the shortest time. Businesses, schools, government, people, and so on can use location information in many ways to improve security, safety, service, Return on Investment (ROI), and in general, efficiency.

Today, with the increase in technological sophistication, it's now feasible to locate anything or anyone in real time anywhere. The system that accomplishes this is the *Real Time Location System (RTLS),* and this is usually achieved by making use of small electronic devices (or *tags*) attached to people or things at any time. You may have bought this book because there's something about an RTLS that you want to know more about, or maybe you

bought this book only because it was in a *really* right location. Whatever the reason, I hope to give you the theories you need to know with the practical experience and advice you need to get an RTLS working for you.

About This Book

This book gives you the whole RTLS story, from soup to nuts, in the easy to understand *For Dummies* format. I begin with a tour of the RTLS applications and then serve you the details of what goes into an RTLS and what the various RTLS technologies are. Then, I plunge into the practical things that you need to consider before installing an RTLS and the common pitfalls that you need to be aware of. I include a chapter on evaluating an RTLS solution or selecting an RTLS vendor. And because RTLS security is equally as important as its accuracy, I also include a chapter on possible RTLS hacks and attacks.

After reading this book, you'll know what an RTLS is, how an RTLS is achieved, how to choose the right RTLS technology, and how you can make an RTLS work for you.

Like other *For Dummies* books, this one's been designed to let you skip around as much as possible. If you don't want to read this book cover to cover, you don't have to. Your current knowledge or experience of an RTLS makes some topics more relevant than others. If you want to zero-in on a particular topic, you can use the Table of Contents and index to focus on that coverage. As much as possible, I made it unnecessary for you to have to remember anything covered in another section of the book. From time to time, however, you'll come across a cross-reference to another section or chapter in this book.

For the most part, such cross-references are meant to help you get more complete information on the subject, should you have the time and interest. If you have neither, no problem; just ignore the cross-reference as if it never existed.

Conventions Used in This Book

Some books have a dozen dizzying conventions that you need to know before you can even start. Not this one.

All you need to know is that new terms are given in *italics.*

When I discuss formulas (yes, I admit: I give a few formulas in the book), they're indented from regular paragraphs like so:

$$E = mc^2$$

Foolish Assumptions

Well, technically speaking, this book is *For Dummies.* However, you and I both know what that means. *For Dummies* is a style for reference books that introduces a technology, a concept, or a product in an easy to understand way.

This book is for anyone who wants to find out more about the RTLS and make use of real-time information to

improve productivity, find and address deficiencies in processes, enhance customer support, or increase safety or security. Whether you're brand new to an RTLS or you're looking to expand your current RTLS deployment, this book is for you. This book is for network administrators who are responsible for selecting, deploying, or maintaining the RTLS. This book is for the business solutions vendors as well as RTLS applications developers who are developing the RTLS applications and want to understand the landscape of RTLS technologies. And, this book is also for the innovators who want to create new technologies or improvise existing technologies to address what isn't addressed by current technologies.

For this book, I don't assume that you have in-depth knowledge of Wi-Fi, radio frequency identification (RFID), or any specific technology; however, this book does have some geek-speak from time to time. Like any *For Dummies* book, those sections are clearly marked with the Technical Stuff icon, which you can skip.

How This Book Is Organized

RTLS For Dummies is organized into six different parts. The following sections describe the various parts in this book.

Part I: Getting Your Bearings in RTLS

As the name implies, this part gets you started on your RTLS tour. Here, you get an overview of how an RTLS is used today and what it has to offer. You see a good sampling of the RTLS applications in Chapter 1 and get acquainted with the RTLS elements in Chapter 2. Chapter 2 also delves into various locating methodologies and technologies that can be used to achieve an RTLS. Then, you get familiar with all that's involved to implement the right RTLS in Chapter 3.

Part II: Implementing RTLS in Your World

This part is all about the practical advice that will help you make the RTLS work for you. You get guidance for planning your application and ideas for ways you might use the RTLS in your organization in Chapter 4. Chapters 5 and 6 deal primarily with preparing for installation and monitoring an RTLS. And, I explain the opportunities for integration of an RTLS with other business applications in Chapter 7.

Part III: Tag-A-Palooza: RTLS Technology Tour

In this part, you build the foundation that will help you choose the right locating technology. Whether you need to locate precisely, detect presence, or locate at any other granularity, Chapters 8–13 give you details on various technologies that can be used to make that happen.

Part IV: Monitoring Performance and Securing RTLS

In Part IV, I share with you the most important aspect of any system — performance monitoring and securing. Chapter 14 provides you with details and how to monitor performance of your RTLS as well as a few metrics that can be used to measure and present the performance of your RTLS system. Chapter 15 armors you with the knowledge of hacks and attacks on an RTLS so that you can establish appropriate defense mechanisms to protect the system's privacy and performance. Countermeasures are also discussed in Chapter 15.

Part V: The Part of Tens

No *For Dummies* book is complete without a Part of Tens. In this part, you find three chapters. In Chapter 16, I share with you my list of the ten most common pitfalls that you might run into — and what to do about them. Chapter 17 provides you ten tips for evaluating RTLS vendors. And because many tags require batteries, I provide ten tips on making the best use of batteries (proper charging, storage, and so on) in Chapter 18.

Part VI: Appendixes

When it comes to an RTLS, a single resource is never enough. Appendix A lists essential resources for staying up to speed on all things RTLS. Knowing where to find

these resources will let you be effective in your RTLS choices. Appendix A also lists essential RTLS references.

Because when an RTLS is applied to people, it can be viewed as a potential threat to privacy, I've devoted Appendix B to privacy issues. And because it's critical to build a compelling business case to justify investments in an RTLS, I show you how to create fact-based benefits realization reports in Appendix C.

Icons Used in This Book

The following icons are strategically placed in the margins to point out stuff you may or may not want to read.

This Tip icon points out a handy shortcut or other valuable hints related to the topic at hand.

This icon marks something to remember — information that's especially important to know. To siphon off the most important information in each chapter, just skim through these icons.

This icon alerts you to nerdy discussions that you may well want to skip (or read when no one else is around).

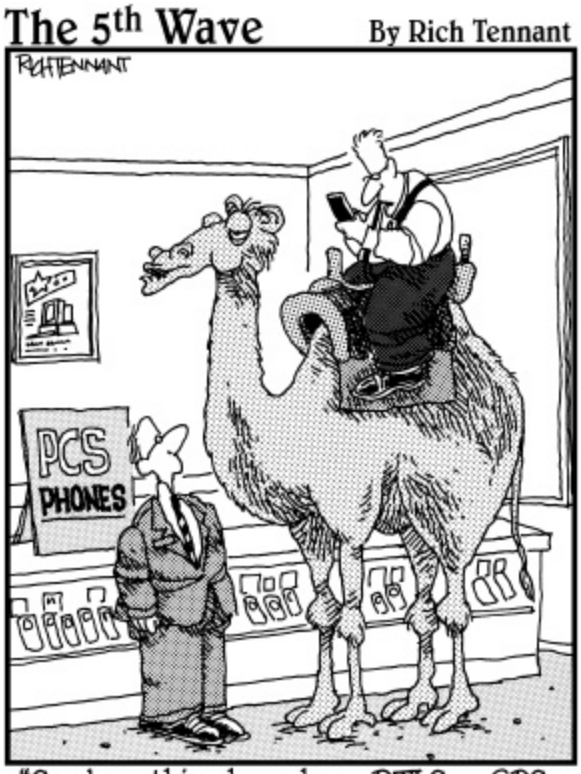
Although the Warning icon appears rarely, when you need to be wary of a problem or common pitfall, this icon lets you know.

Where to Go from Here

All right, you’re all set and ready to jump in. You can jump in anywhere you like — the book was written to allow you to just do that. But, if you want to get the full story from the beginning, jump into Chapter 1 first — that’s where all the action starts. (If you’re familiar with what RTLS is all about and are already in the process of evaluating various technologies, you might want to flip to Chapter 8.)

Part I

Getting Your Bearings in RTLS



"So does this phone have RTLS or GPS capabilities?"

In this part . . .

With all the buzz in recent years around RFID and then the success of GPS, the concept that you can locate anything or anybody automatically in real time is catching everyone's attention. In Chapter 1, I give you some examples of where an RTLS is, or could be, used. An RTLS can be the solution for applications in