Virtual Reality Technology, 2nd edition

Authors: Grigore C. Burdea & Philippe Coiffet
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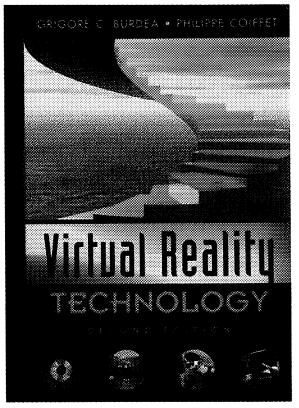

Although this is a well written introductory book on the subject of Virtual Reality (VR), I would not recommend it for the general bookshelf of a typical clinical engineering department. The book is a significant revision of one of the standard textbooks on this subject. It is clearly written to be a textbook that accompanies laboratory exercises with appropriate equipment and exercises. In spite of the textbook orientation, I found it to be an interesting overview of a topic that will become more important for those concerned with technology.

Assessment: VR is a field the scientific community has been working on for many years. Advancements in technology have made VR a truly useful tool that is finding several valid applications in industry, military, medicine, and entertainment; yet the book makes clear that there is still a long way to go before it will be common place. This book offers a good way to "get up to speed" on a very active field of research and innovation. It will give readers a solid understanding of the basic principles and terms used. As many of us have learned, understanding the "buzz words" is often key to understanding new material. This book defines virtual reality as "a high-end user-computer interface that involves real-time simulations and interactions through multiple sensorial channels. These sensorial modalities are visual, auditory, tactile, smell, and taste."

Features: Several chapters are devoted to input devices, output devices, computing architectures, modeling, VR programming, and human factors. There is also a chapter on "traditional" VR applications of medicine, education, arts, entertainment, and the military. The final chapter deals with VR applications in manufacturing, robotics, and information visualization.

The CD that comes with the book has some significant shortcomings. The preface explains projector icons are found at different points in the book to indicate where there are accompanying video clips on the CD. Unfortunately, the book does not directly refer to the clips in the text — the same way that figures are referred to. The video clips do not have captions, unlike the figures that were accompanied by a capsule description. I use Windows XP on my computer. With this operating system, Windows Media Player tends to come up automatically when Real Media Player files are detected. When this happened, the list of video clip selections displayed by Media Player didn't match up with all of the icons in the book. Use Windows Explorer to see all the files, including the Acrobat file that gives a brief thumbnail description of the different clips.

For a book that was written in 2002 (based on the references) and published in 2003, I was quite disappointed that there were no web addresses in the book or on the CD. Because this is a rapidly changing field, the products used as illustrations in the book and CD have all been updated since publication. Web links would enable the reader to see what has transpired since the book was written. Similarly, I would have expected some mention of technical societies devoted to VR such as the Human Simulation Web Community (www.simdot.org). These societies provide a quick means of finding out the latest advances in the field.

As it is the aspect of VR that I was most familiar with, I paid particular attention to the part of the book on VR in medicine. I was quite surprised that there was no mention of the use of robotic surgery (www.intuitivesurgical.com) or the Human Simulation and Patient Safety Center (http://simcenter.duhs.duke.edu)

In spite of these limitations, I found this a fascinating book on a subject that everyone in medical technology will be using more of in coming years. Perhaps some of the readers who read this book will be motivated and inspired to make a contribution to this dynamic field. This book clearly illustrates how much has been accomplished and how far we have to go.

Reviewed by Alan Lipschultz, CCE
Director, Clinical Engineering
Christiana Care Health Services
Newark, Delaware

Other Ways to Check ESU Analyzers

In response to Ray Nielsen's "Troubleshoot It" column in the January/February issue of *BI&T*, electrosurgical unit (ESU) analyzers should be frequency sensitive and should, like a DVM, have a bandwidth to consider. Checking an ESU analyzer with 60 cycle energy might not be advised. I see that it is just a check and not calibration, but we depend on calibrations from outside sources for our credibility.

I propose that the more accepted methodology to verify the reading or function of an analyzer would be to use some other calibrated device, or group of devices (scope, resistor, and RMS meter together), to check the reading of the ESU analyzer. A review of the last few regular checks of any ESU would give a good indication of expected values. As a result, the trust could be placed or question be addressed regarding the ESU analyzer accuracy, which brings us back to credibility. It gets repaired and calibrated by an outside lab–unless the biomed shop is big enough to have standards in place to allow such calibration. Ray goes on to discuss the use of a DVM's beep function for patient lead wire checking. Well, that's one method but let's not forget those wires with 10K ohm or even 1 meg ohm or more. Can all meters handle that range and beep?

Michael Rende, CBET
Biomedical Engineering
Veterans Affairs Health Care Systems-Chicago

Troubleshooting ESU Analyzers

***Editor's Note**: We asked Ray Nielsen, author of* BI&T*'s "Troubleshoot It" column to respond.*

Often an ESU analyzer will use a thermocouple type sensor to convert the radio frequency current into heat and subsequently into a direct current so it can be read proportionally. A thermocouple isn't frequency sensitive and that's the beauty of the test I described in the column (*BI&T*, Vol. 38, No. 1, p. 34).

If you made measurements as suggested in the article and compared them to your calibration reports, you'd find a very good correlation, at least I have. The multimeter I used to measure line voltage was recently calibrated and the resistance of the ESU testers resistors can be measured with fair accuracy as well.

While there is no comparison against a recognized standard, it still yields a useful measurement—it indicates whether or not the tester is working. Usually a DVM's beeper activation circuit is based on a percentage of the resistance range you've selected. If you manually select an appropriate range and learn the percentage that the beeper responds to, you can effectively detect resistances that rise above the threshold with the beeper function.

Ray Nielsen
Author of *BI&T*'s "Troubleshoot It" column

Web Site Provides Access to Virtual Technology Update

I read with interest the review of my book *Virtual Reality Technology* (2nd edition, June 2003) that appeared in the "The Reading Room" (*BI&T*, Vol. 38, No. 2). Mr. Alan Lipschultz notes correctly that the rapidly-changing nature of virtual reality (VR) requires a book with significant Web links. The Laboratory Manual (included on the book CD) has a "Resource" Section (pages 106-108) giving Web links to the VR companies used in the Manual. In August 2003, I set up the domain www.vrtechnology.org, which has links to all VR courses in the world. Furthermore, in response to Mr. Lipschultz's constructive observations, I recently added a page on the same URL with links to VR companies and research laboratories.

I share the reviewer's belief that VR is "a subject that everyone in medical technology will be using more of in coming years." Thus I wanted to inform *BI&T*'s readership of these developments, which I hope they will find useful.

Grigore C. Burdea PhD
Professor of Electrical and Computer Engineering,
Director of the Human-Machine Interface Laboratory
Rutgers University

We welcome your comments. Write to: Managing Editor, c/o AAMI, 1110 N. Glebe Road, Suite 220, Arlington, VA 22201, or e-mail mpiotrowski@aami.org