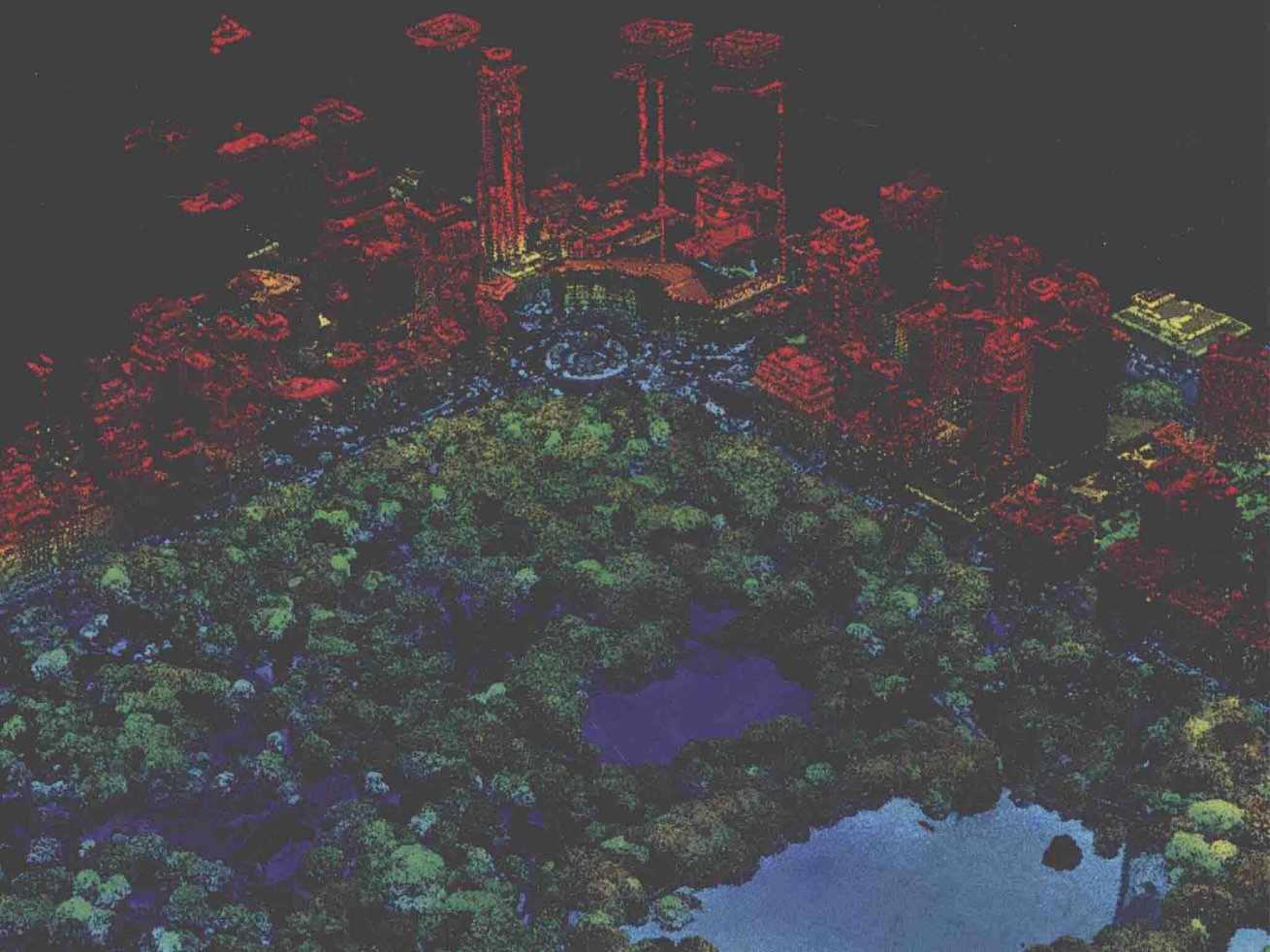


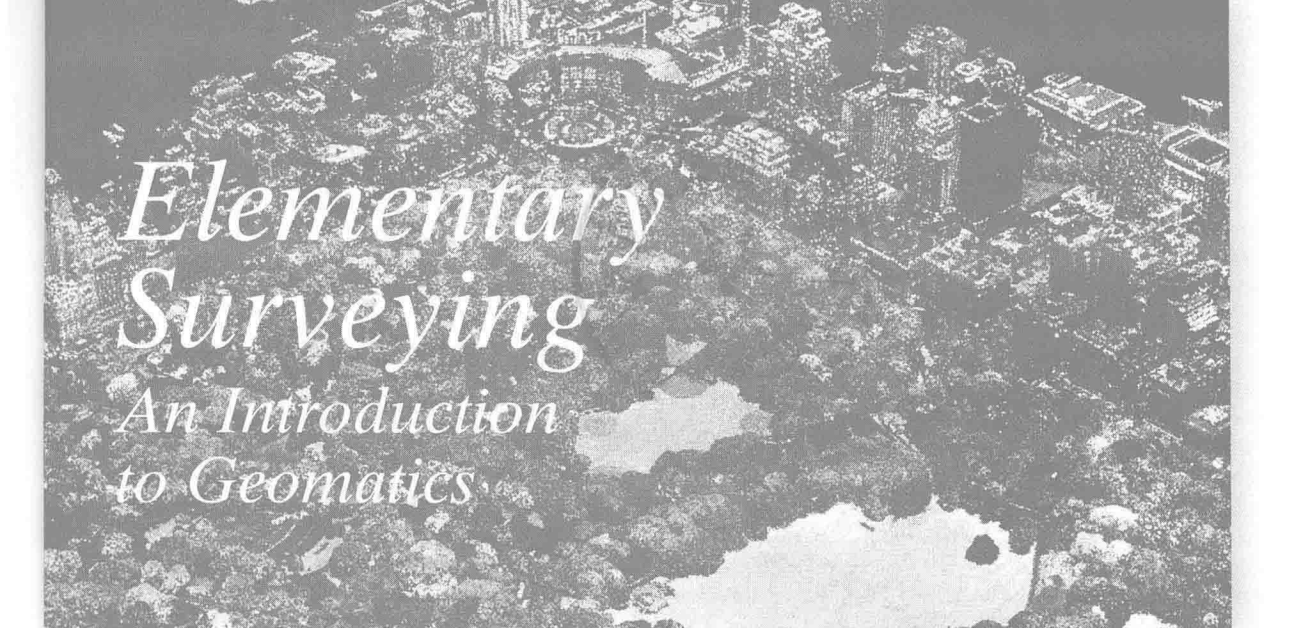
Charles D. Ghilani • Paul R. Wolf

ELEMENTARY SURVEYING

An Introduction to Geomatics

14th Edition





Elementary Surveying

*An Introduction
to Geomatics*

Fourteenth Edition

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Preface

This 14th Edition of *Elementary Surveying: An Introduction to Geomatics* is a readable text that presents basic concepts and practical material in each of the areas fundamental to modern surveying (geomatics) practice. It is written primarily for students beginning their study of surveying (geomatics) at the college level. Although the book is introductory to the practice of surveying, its depth and breadth also make it ideal for self-study and preparation for licensing examinations. This edition includes more than 400 figures and illustrations to help clarify discussions, and numerous example problems are worked to illustrate computational procedures. Recognizing the proliferation of intelligent phones and the intention of Internet browsing ability in these phones and tablet devices, QR Codes have been introduced with this edition. These codes indicate that a video lesson on the material is available from the companion website for this book at <http://www.pearsonhighered.com/ghilani> and are accessible using a smart phone or other device with a QR code reader. See sample QR Code to the right. The 65 videos provide complete, step-by-step solution walkthroughs of representative problems from the text and proper instrumentation procedures to use when in the field. These videos also provide additional assistance for students when working with equipment during homework and field exercises or in preparing for an exam or quiz. *Please note: Users must download a QR code reader to their smartphone or tablet. Data and roaming charges may also apply.*



In keeping with the goal of providing an up-to-date presentation of surveying equipment and procedures, total stations are stressed as the instruments for making angle and distance observations. With this in mind, a section on planning a ground-based laser scanning survey has been introduced in this edition. Additionally, the LandXML format to exchange mapping files has also been introduced.

Since taping is now limited to distances under one-tape length and since tape corrections are seldom, if ever, performed in practice, tape correction problems

have been moved to Appendix A. However, it is still important that the study of surveying including a complete presentation of taping so that students understand the proper use of tapes. Thus a discussion of the correction for systematic errors found in taping are still retained in this edition. Furthermore, transits and theodolites, which are not used in practice, are just briefly introduced in the main body of the text for historical purposes. For those who still use these instruments, the reader should refer to previous editions of this book.

As with past editions, this book continues to emphasize the theory of errors in surveying work. At the end of each chapter, common errors and mistakes related to the topic covered are listed so that students will be reminded to exercise caution in all of their work. Practical suggestions resulting from the authors' many years of experience are interjected throughout the text. Many of the 1000 after-chapter problems have been rewritten so that instructors can create new assignments for their students. An Instructor's Manual is available on the companion website at <http://www.pearsonhighered.com/ghilani> for this book to instructors who adopt the book by contacting their Prentice Hall sales representative. Also available on this website are the short videos presenting the solution of selected example problems in this book.

Updated versions of STATS, WOLFPACK, and MATRIX are available on the companion website for this book at <http://www.pearsonhighered.com/ghilani>. These programs contain options for statistical computations, traverse computations for polygon, link, and radial traverses; area calculations; astronomical azimuth reduction; two-dimensional coordinate transformations; horizontal and vertical curve computations; and least-squares adjustments. Mathcad® worksheets and Excel® spreadsheets are included on the companion website for this book. These programmed computational sheets demonstrate the solution to many of the example problems discussed herein. For those desiring additional knowledge in map projections, the Mercator, Albers Equal Area, Oblique Stereographic, and Oblique Mercator map projections have been included with these files. Additionally, instructional videos are available on the companion website demonstrating the solutions of selected problems throughout this book.

WHAT'S NEW

- Video lessons on proper usage of instruments presented in this book.
- Images of new instruments and field book pages that match today's instruments.
- Increased discussions on the changes in reference systems.
- Discussion on planning a laser-scanning survey.
- Discussion on the LandXML drawing exchange format.
- Revised discussion on point codes in field-to-finish surveying.
- Extended coverage on errors present in electronic distance measurements.
- Introduction to mobile mapping systems.
- Revised problem sets.
- Seven new instructional videos, demonstrating instrumental procedures and record keeping.

ACKNOWLEDGMENTS

Previous editions of this book, and this current one, have benefited from the suggestions, reviews, and other input from numerous students, educators, and practitioners. For their help, the authors are extremely grateful. In this edition, those professors and graduate students who reviewed material or otherwise assisted include Robert Schultz, Oregon State University; Steven Frank, New Mexico State University; Jeremy Deal, University of Texas-Arlington; Eric Fuller, St. Cloud State University; Loren J. Gibson, Florida Atlantic University; John J. Rose, Phoenix College; Robert Moynihan, University of New Hampshire; Marlee Walton, Iowa State University; Douglas E. Smith, Montana State University; Jean M. Rüeger, The University of New South Wales, Sydney, Australia; Thomas Seybert, The Pennsylvania State University; Paul Dukas, University of Florida; and Bon DeWitt, University of Florida. The authors would like to acknowledge the following professionals for their contributions and suggestions, including Charles Harpster, Pennsylvania Department of Transportation; Preston Hartzell, University of Houston; Eduardo Fernandez-Falcon, Topcon Positioning Systems; Joseph Gabor; and Brian Naberezny.

In addition, the authors wish to acknowledge the contributions of charts, maps, or other information from the National Geodetic Survey, the U.S. Geological Survey, and the U.S. Bureau of Land Management. Also, appreciation is expressed to the many instrument manufacturers who provided pictures and other descriptive information on their equipment for use herein. To all of those named above, and to any others who may have been inadvertently omitted, the authors are extremely thankful.



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