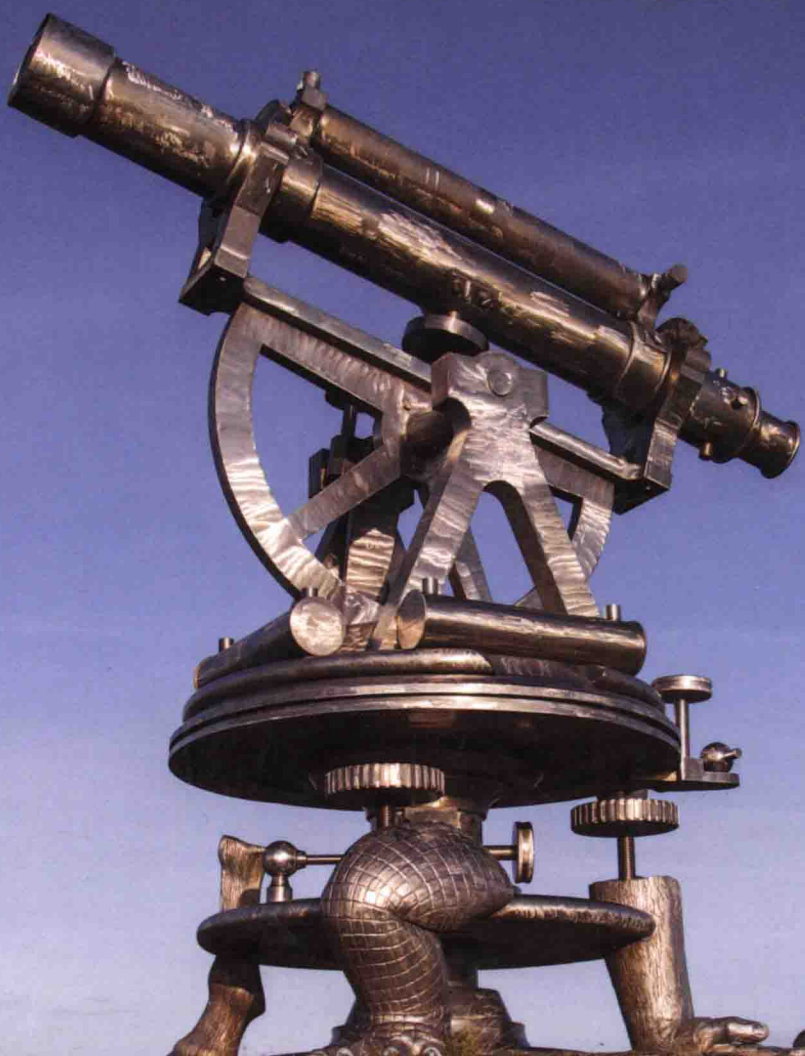
Eugene Levin • Leonid Nadolinets • Daulet Akhmedov

Surveying Instruments and Technology



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Surveying Instruments and Technology

"I am impressed by the detail of this book. Not only has this book provided the history of surveying equipment, but also the reason and technological advances led to these changes. It is also pleasing to see the corresponding mathematics and the accuracies that have evolved to accommodate societies' needs along with equipment companies. It is not difficult to imagine this book will be a good reference in classroom and surveying research as well."

—**Yushin Ahn**, Michigan Technological University, USA

"While existing literature in recent years has been concentrating on computer processing of the developments in surveying, the book adds the area of instrumentation and its use, which so far has been missing and is not accessible elsewhere. The international authors ought to be congratulated on this effort to fill the void. They have added clear illustrations of the detailed components of instrumentation and the use of these tools. The book will serve as a fundamental reference in modern survey literature for students and practitioners in civil engineering and geoinformatics."

—**Gottfried Konecny**, Leibniz University Hannover, Germany

Surveying Instruments and Technology covers the whole range of up-to-date surveying instruments including optical and electronic levels, optical and electronic theodolites, and routine and robotic total stations. It will discuss also modern surveying instruments such as satellite signal receivers, GPS, and GNSS. Written as a practical handbook, it will serve as a useful asset in training and education of the geospatial workforce.

Features

- In depth discussion and analysis of geospatial measurements principles
- Review of the state-of-the-art surveying instruments worldwide
- A practical tool for geospatial professionals' training and education
- Analysis of emerging trends in geospatial measurements (UAV/LIDAR)
- Helps to understand what is happening "behind the button" of modern surveying instruments

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and Daulet Akhmedov

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Surveying Instruments and Technology

Preface

Surveying is one of the most ancient professions, and in recent years it has been boosted by technology advances. These advances come from developments in optical, mechanical, electronics, aerospace, sensor, and information technologies. To this end, instrumentation deployed by modern surveyors is associated with a significant body of knowledge. This book is about surveying instruments and covers all aspects of them, including historical references, physical and constructional principles of operation, and features of modern instruments. The idea of creating a book about surveying instruments occurred to us while speaking with our colleagues and customers. Existing books in the field of surveyor's instruments were published many years ago and do not include up-to-date surveying instruments information. We believe this book is long overdue as a complete description of the latest surveying instruments.

This book is suitable for undergraduate and graduate students who are taking surveying courses, and professional surveyors seeking a better understanding of surveying instruments. Field surveyors working on large construction projects, such as road networks and buildings, and other geodetic control networks may find useful details presented in this book. Surveying business owners may also benefit.

It is hoped that this book will help readers to become aware of technological solutions behind the development of surveying instruments.

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Authors

Leonid Nadolinets lives in Moscow, Russia. Nadolinets has devoted his life to studying and developing surveying instruments. His PhD thesis covered topical surveying instrument developing. Nadolinets has worked as a research fellow at many research institutes in Russia and abroad. He has also attended training courses arranged by leading surveying manufacturers from the United States, Europe, Japan, and China. Currently, Nadolinets heads a consulting company that develops and maintains surveying instruments.

Eugene Levin is the program chair of surveying engineering and associate professor at the School of Technology at Michigan Technological University. Levin also directs the Integrated Geospatial Technology graduate program. He earned an MS degree in astrogeodesy from Siberian State Geodetic Academy in 1982 and a PhD in photogrammetry from Moscow State Land Organization University in 1989. He has more than 30 years of experience in academia and the geospatial industry in the United States, Israel, and Russia. He has held research and management positions with several academic institutions and high-tech companies, including the Research Institute of Applied Geodesy, Omsk Agricultural Academy, Rosnitc "Land," Ness Technologies, Physical Optics Corporation, Digital Map Products, American GNC, and Future Concepts. He has served as a principal investigator and project manager for multiple award-winning government programs.

Daulet Akhmedov has a PhD in theory of mechanisms and machines, and a PhD+ in geo-information and geotechnology. He is currently a director at the Institute of Space Technique and Technology, in Almaty, Kazakhstan. His research interests include mathematical models and numerical methods for solving the problem of simulating motion of mine dumps of various models, mainline, and shunting locomotives and trains; mathematical models and numerical methods for high-precision satellite navigation; design and development of geographic information systems (GIS); design, manufacture, and implementation of communication systems based on low-orbit satellite communication systems; design, manufacture, and implementation of high-precision satellite navigation systems; and development of dispatching systems based on the use of low-orbiting satellite systems, VHF and GSM communications, satellite navigation technologies, and GIS technologies.

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