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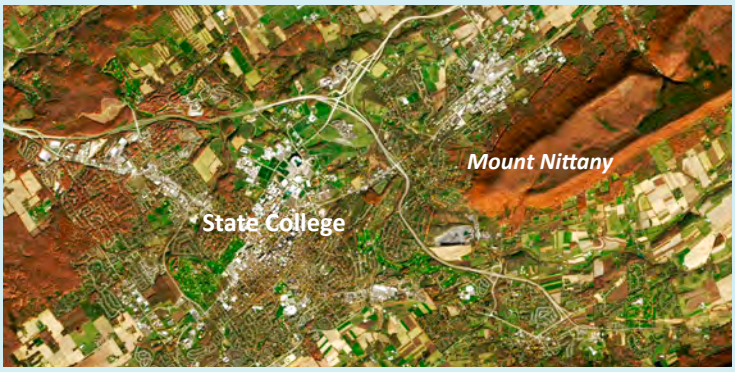
PHOTOGRAMMETRIC ENGINEERING & REMOTE SENSING The official journal for imaging and geospatial information science and technology

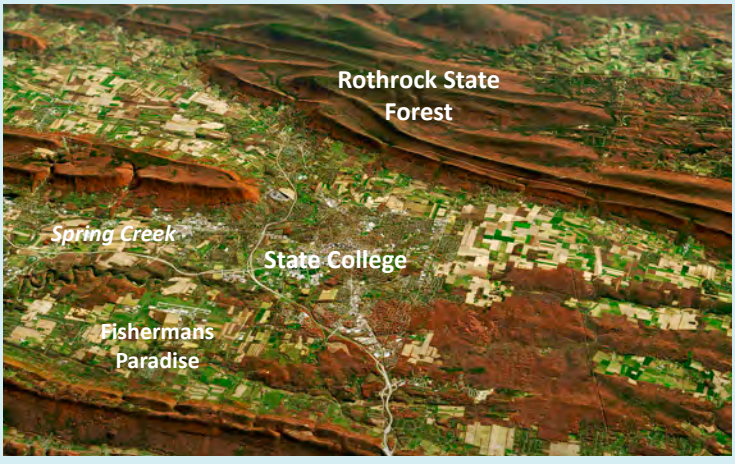
COVER DESCRIPTION



Along with the plentiful harvest of crops in North America, one of the gifts of autumn is the gorgeous palette of colors created by the chemical transition and fall of leaves from deciduous trees. It is an aesthetic wonder from the ground, from the mountaintop, and from satellites.

The folded mountains of central Pennsylvania were past peak leaf-peeping but still colorful when the Operational Land Imager (OLI) on the Landsat 8 satellite passed over on November 9, 2020. The natural-color images above show the hilly region around State College, Pennsylvania; the one below shows the same scene overlaid on a digital elevation model to highlight the topography of the area.

The region of rolling hills and valleys is part of a geologic formation known as the Valley and Ridge Province that stretches from New York to Alabama. These prominent folds of rock were mostly raised up during several plate tectonic collisions and mountain-building episodes in the Ordovician Period and later in the creation of Pangea—when what is now North America was connected with Africa in a supercontinent. Those events created the long chain of the Appalachians, one of the oldest mountain ranges in the world. The Appalachians once stood as tall at the Rockies and Alps, but hundreds of millions of years of erosion have worn them down.



The close-up and oblique satellite views capture Mount Nittany, State College, and University Park, home of The Pennsylvania State University. The mascot of the university and several other groups in the area is the Nittany Lion, a localized name for the now-extinct eastern cougar.

The river valleys between and beside these mountains are quite popular with fishermen. Spring Creek is considered one of Pennsylvania's best trout fisheries and is a popular destination for fly fishing. Fishermans Paradise was the first special regulation area for trout in the United States, and Penn State was the first university in America to offer credited courses in fly fishing.

To see the images in detail, visit https://landsat.visibleearth.nasa.gov/view.php?id=147580.

NASA Earth Observatory images by Joshua Stevens, using Landsat data from the U.S. Geological Survey and data from NASA/METI/AIST/Japan Space Systems, and the U.S./Japan ASTER Science Team. Story by Joshua Stevens and Michael Carlowicz.

PHOTOGRAMMETRIC ENGINEERING & REMOTE SENSING

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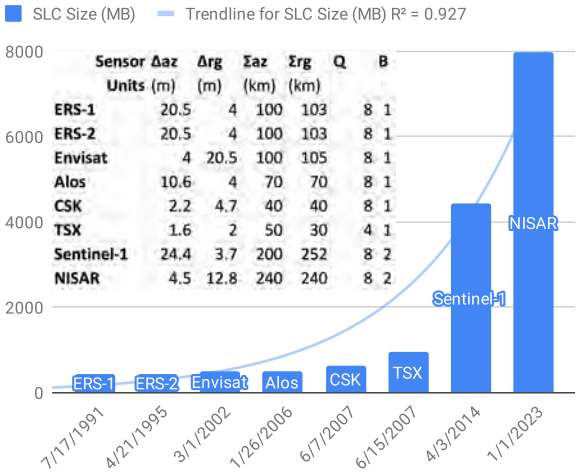


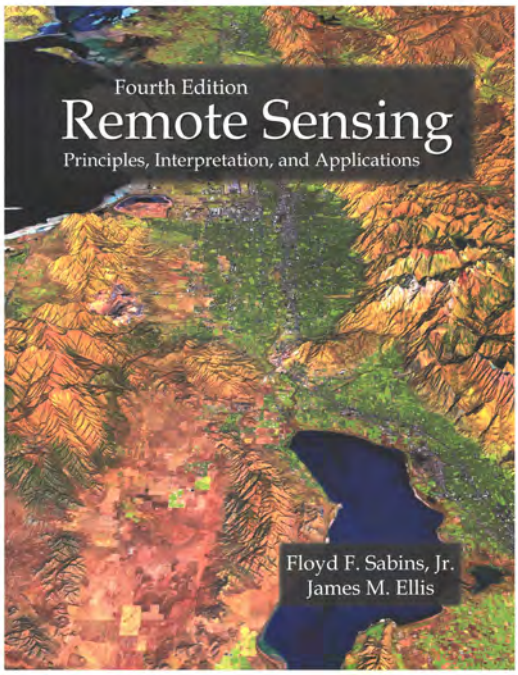
Sensor	Δaz (m)	Δrg (m)	Σaz (km)	Σrg (km)	Q	B
ERS-1	20.5	4	100	103	8	1
ERS-2	20.5	4	100	103	8	1
Envisat	4	20.5	100	105	8	1
Alos	10.6	4	70	70	8	1
CSK	2.2	4.7	40	40	8	1
TSX	1.6	2	50	30	4	1
Sentinel-1	24.4	3.7	200	252	8	2
NISAR	4.5	12.8	240	240	8	2

COLUMNS

ANNOUNCEMENTS

DEPARTMENTS

See the Cover Description on Page 4



Remote Sensing. Principles, Interpretation and Applications, Fourth Edition

Floyd F. Sabins, Jr. and James M. Ellis

xiv+524 pages, black and white figures, color plates. 2020. Waveland Press, Inc. Long Grove, IL. ISBN-13: 978-1-4786-3710-3 ISBN-10: 1-4786-3710-2. Paperback and eBook: $89.95; Kindle: $67.46.

Reviewed by Demetrio P. Zourarakis, PhD, GISP, CMS (GIS, RS, Lidar), Adjunct Assistant Professor, Dept. of Plant and Soil Sciences - University of Kentucky.

Voluminous (3 pounds; 8.5 x 11 inches) but handy, this remote sensing textbook provides a comprehensive and a didactic snapshot of the state-of-the-practice. This work is the result of a drastic update necessary to create this new edition - which as expected covers a broad range of topics, and systematically addresses the fundamentals of the underlying sciences and technologies, while maintaining a constant focus on specific and well-illustrated real-world applications.

This is the fourth edition of the book, and twenty-three years have elapsed since its last edition. A brief memorial in remembrance of the book's first author, Dr. Floyd F. Sabins, Jr., appears at the beginning. The authors embarked on a substantial and successful effort to cover all the developments in the science, technology, and art of remote sensing that happened in the last quarter-century. Thus, the book has six new chapters, and more than half of its 500 figures and color plates are new. A few examples of current topics of remote sensing applications incorporated in this work are the monitoring of the effects of climate change (*Chapter 16*), the processing of sensor data from unmanned aerial systems (*Chapter 8*), and the emergence of new lidar technologies (*Chapter 7*).

The book sports a clear exposition without any noticeable typographic errors or grammatical issues. It is divided into seventeen chapters: *Chapter 1—Introduction to Concepts and Systems; Chapter 2—Aerial and Satellite Photographs; Chapter 3—Landsat Images; Chapter 4—Multispectral satellites; Chapter 5—Thermal Infrared Images; Chapter 6—Radar Images; Chapter 7—Digital Elevation Models and Lidar; Chapter 8—Drones and Manned Aircraft Imaging; Chapter 9—Digital Image Processing; Chapter 10—Geographic Information Systems; Chapter 11—Environment; Chapter 12—Renewable Resources; Chapter 13—Nonrenewable Resources; Chapter 14—Land Use/Land Cover; Chapter 15—Natural Hazards; Chapter 16—Climate Change; and Chapter 17—Other Applications*. Fifty-five full-color plates cover sixteen pages inserted between *Chapter 10* and *Chapter 11*; black-and-white figures are distributed within each chapter, throughout the book. Each chapter includes a section with questions and a reasonable and manageable number of references, available to the reader's further exploration. An extensive glossary is provided at the end of the book, appearing before the index.

Being earth sciences (i.e. geology) at the heart of the authors' background, it should not surprise us that the book draws rather strongly from their combined wealth of professional career experiences on the use of remote sensing in geology. This is noticeable particularly in the longest chapters of the book; *Chapter 6* (Radar Images), *Chapter 13* (Nonrenewable resources), and *Chapter 15* (Natural Hazards), all of which span about forty pages each, in contrast with the median chapter length of twenty-eight pages. In fact, the land use/land cover chapter (*Chapter 14*) is one of the shortest ones at eighteen pages long. *Appendix A* provides the reader with a brief primer on the basic principles of geology with a focus on remote sensing. Hence, while it is unavoidable to encounter examples of use cases that have a

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geological slant throughout the book, this should in no way be considered a flaw or a deterrent to its use.

The authors present the reader with a good educational tool, developing the topics in such a way to whet one's appetite for deeper knowledge. It is innovative in that the examples of applications are obviously derived from projects. This fresh, project-centric feel is contextualized as the locations of examples of use cases illustrated throughout the book are shown in maps on *Appendix B*. The material lends itself to be organized in the fashion of a story map, thus offering the opportunity to contribute to the integration of GIS and remote sensing as part of the curriculum. Abundant, on-line companion materials are made available to support the docent planning to utilize this textbook in his/her classes. *Appendix C* in the book informs the reader of the *Remote Sensing Digital Database*. In addition to that resource, a *Digital Image Processing Lab Manual*, and *Introductory and Instructional Videos and Answer Keys* can be found at: http://waveland.com/Sabins-Ellis.

Possibly, this textbook could be used in more than one introductory course in remote sensing at the college or university level– with the caveat that the eBook version may be more manageable than the printed one. Its use may have to be complemented and/or expanded with more subject-specific materials, particularly if the emphasis on geology is found to be sidetracking or distracting. Alternatively, when in the library of a professional, this book can be a valuable resource to be used in outreach to, and professional development of practitioners in either the geospatial domain or other fields.