

# Applications of 3D Measurement from Images

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## Book Data

First Edition – 2008  
Edited By: John Fryer, Harvey Mitchell & Jim Chandler  
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304 Pages – With Companion CD

## Introduction

How has terrestrial or close-range photogrammetry been applied to different measurement problems historically? How are changes in photography, including the introduction of digital photography, changing the ways terrestrial photogrammetry can be applied?

*Applications of 3D Measurements from Images* is a book that thoroughly examines these questions and attempts to answer them.

## Summary of Contents

The material in the introduction of the book and in the first chapter, *Fundamentals of Photogrammetry*, will be of interest to individuals from various professions in which accurate measurements of objects are necessary. The first chapter provides a good overview of some basic photogrammetric principles. (This material is duplicated in other textbooks on photogrammetry, but provides a good foundation for exploring later topics in the book.) The introduction provides an interesting perspective on how terrestrial photogrammetry has been applied historically and in our current time period. It also makes interesting observations on the future of terrestrial photogrammetry and introduces ideas of what innovations may lay ahead.

Each of the following seven (7) chapters examines the application of terrestrial photogrammetry to a particular problem domain. The applications discussed in the book are:

- Chapter 3: Structural Monitoring
- Chapter 4: Engineering and Manufacturing
- Chapter 5: Forensic Photogrammetry
- Chapter 6: Quantifying Landform Change
- Chapter 7: Medicine and Sports
- Chapter 8: Biology and Zoology
- Chapter 9: Cultural Heritage Documentation

In addition, Chapter 10, *Sensor Integration and Visualization* considers the construction of 3D “worlds” using terrestrial photogrammetry and other data sources, like existing drawings and laser scanner point clouds.

## Review of Books Content and Style

Positive qualities of the book included the following:

- Ample black and white illustrations and photographs. (A section of color images or plates is included in the middle of the book.)
- Coverage of a wide range of topics that will appeal to a variety of professions.
- Encouraging the reader to reexamine the traditional “limits” of terrestrial photogrammetry and to consider how it could be applied in new ways to solve accurate measurement problems.
- Each chapter was concluded by a comprehensive bibliography of additional reading material that dealt with the same (or similar) topics as the chapter.
- The book contains several honest observations, like one at the end of the introduction, which states: “Light will continue to travel in straight lines and an understanding of geometry will be just as valid tomorrow as it is today. The need for an appreciation of spatial analysis, call it geomatics or surveying principles, is still a paramount criterion for the extraction of geometrically strong 3D objects from images.”

There are some areas in which the book could have been improved. This included the following:

- Greater consistency in the structure and layout of each chapter. Each chapter examined very different application of terrestrial photogrammetry and was written by a different author or group of authors. Enforcing (to the extent possible) a consistent structure for each chapter would have made it easier for the reader to move from one topic to the next. An example of this inconsistency is the way Chapter 2 dives immediately into case studies after a short introduction, while Chapter 7 has an introduction, discusses the advantages and disadvantages of terrestrial photogrammetry to the application domain, gives an overview of the history of the application of terrestrial photogrammetry to the problem domain, and explains what makes the problem domain unique. Only after the coverage of these other topics does Chapter 7 begin to discuss case studies.
- A better explanation of the formulas given in the book. The formulas are clearly stated, but the derivation and explanation of the formulas seemed to be lacking. The book doesn’t claim to be a mathematical textbook for terrestrial photogrammetry, but it should leave out the formulas or do a better job making sure the reader could understand them.
- The book mentioned laser scanning (and other surveying methods) in several different places. The reasons seemed to be more the author’s interest in these techniques than it was the topics good fit with the books subject. At a minimum, a discussion of laser scanning and a comparison of traditional surveying techniques should be moved to their own chapters.

## Conclusion

*Applications of 3D Measurement from Images* is a well-written introduction to the many possible applications of terrestrial photogrammetry. It is not a photogrammetry textbook or a detailed examination of any one application of terrestrial photogrammetry. A great deal of its material would be suitable to introduce a software developer or student to the different applications of terrestrial photogrammetry, but doesn't contain enough meat to provide real benefit in developing software for terrestrial photogrammetry applications. Land Surveyors may enjoy the chapter on the fundamentals of photogrammetry, the chapters examining its application to structural monitoring and to quantifying landform change. However, most of the material will not be applicable to the daily tasks that most land surveying and mapping professions perform. It is a good source of ideas and inspiration for professionals that are interested in building new business or business services around applications of terrestrial photogrammetry.

## Contents of the CD

*Applications of 3D Measurement from Images* is accompanied by a CD with supplemental material. This material includes color versions of the black and white images in the book. The images are accessed through a web browser and are organized by chapter. There are also several movies that take the viewer on 3D tours of "virtual worlds" constructed of various sites. This includes a cave, a crypt, a monastery and a landside site. The videos are in several different file formats, including MOV, AVI, WMV, and GIF. They are also accessed through a web browser.