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APPLICATIONS OF 3D MEASUREMENTS

THE EDITOR REVIEWS A COMPENDIUM ON MEASUREMENT IN DIGITAL PHOTOGRAMMETRY

In "Applications of 3D Measurement from Images", editors John Fryer, Harvey Mitchell and Jim Chandler have skilfully assembled contributions from twelve leading experts in the field of digital photogrammetry, including themselves. In ten chapters, this 300+ page text from Whittles Publishing in Scotland, UK, presents a series of detailed case studies showing how digital photogrammetry provides highly accurate spatial data for solving a wide range of complex measurement problems at widely differing scales.

Following a brief introductory chapter that offers definitions and a short scene-setting history of photogrammetry, Chapter 2, by Dr. Harvey Mitchell, introduces the reader to the 'fundamentals of photogrammetry' in 28 well-illustrated pages, providing sufficient background for even the non-expert to be able to appreciate the chapters that follow.

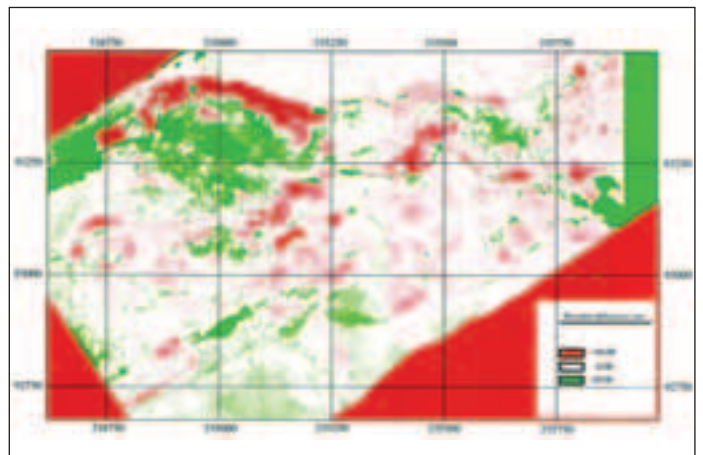
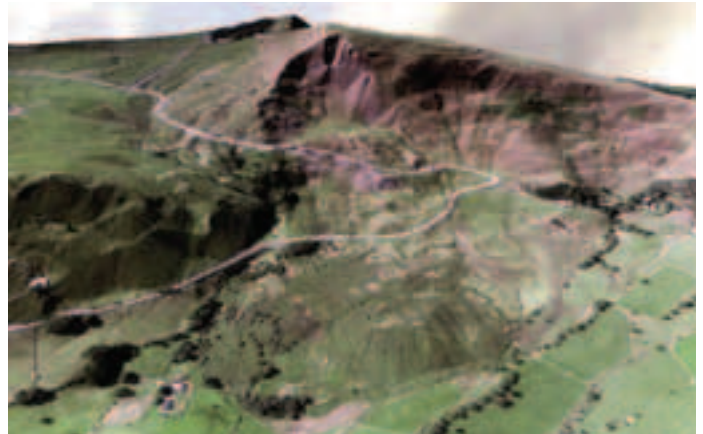
In Chapter 3, Clive Fraser moves on to 'structural monitoring' using photogrammetric measurement techniques, presenting interesting examples ranging from bridge deformation, design and deformation analysis of the Hobart Radio Telescope, to typical building construction projects, measuring the performance of reinforced concrete bridge beams, super-hot steel beams and large industrial equipment.

Close range photogrammetry for measurements in engineering and manufacturing are presented in a well-referenced Chapter 4 by co-authors Stuart Robinson and Mark Shortis. Both accuracy and quality control of measurements are examined and practical applications are demonstrated. Case studies are as diverse as production line measurement of an Airbus aircraft wing root, remote surveying inside the JET fusion reactor, measuring solar sail surfaces for NASA and examining flame-cut ship plates.

Moving on the forensic photogrammetry, John Fryer begins Chapter 5 with a general overview of forensic applications, including the disadvantages of photogrammetry, before moving on to the aspects that make forensic photogrammetry distinctive, looking in more detail at the requirements, i.e. cameras, software, control targets, etc. Alternatives to forensic photogrammetry are presented, revealing that while photos can provide information to help solve a problem, traditional survey methods also come into play in demonstrating the solutions. Case studies include looks at shoe sizes, gun sizes, motor vehicle traffic accidents, racing cars and virtual autopsy ("virtopsy") which integrates photogrammetry with more traditional forms of medical imaging and scanning.

In Chapter 6, three co-authors (Chandler, Lane and Jan Walstra) look at measurement at different scales, measuring changes in landform, from small scale landslides and coastal change down to medium-scale applications, such as rivers, to large-scale 'micro-relief' measurements, such as individual flume processes. The detailed case studies focus on these three scales and subjects, i.e. a 30 x 10 metre flume, river bed change in the Waimakariri River, New Zealand, and landslides in coastal areas of UK's Devon coast and the Pennine Hills of England. These case studies highlight both the advantages and disadvantages of photogrammetry for measurement, introduced at the beginning of the chapter.

Chapter 7, which will be of less direct interest to geospatial practitioners, looks at photogrammetric measurement of humans in medicine and sport. Chapter 8, by Albert Chong, moves on to investigate photogrammetry in biological and zoological measurements, which implies large-



scale objects such as corals, whales, dolphins – and flying snakes! Not of direct importance to geospatial experts perhaps – but highly interesting reading, in any event.

Petros Patias begins Chapter 9 with a look at both advantages and disadvantages of photogrammetry measurement in cultural heritage documentation, before moving on to the distinctive aspects of recording our cultural heritage and the requirements for such documentation. Several interesting case studies are presented, covering instrumentation, processes and outputs. Sabry El-Hakim and Jean-Angelo Beraldin conclude in Chapter 10 with a detailed and in-depth look (39 pages) at sensor integration and visualisation.

The book includes a CD containing the digital illustrations and captions from the various chapters, plus some captivating animations – several .avi and .mov files – highlighting the issues and technologies described elsewhere in the book.

Our verdict? We can recommend this highly readable text both to those with a passing interest in photogrammetric measurement as well as to students looking for a comprehensive introduction to the techniques and tools used in this technology which has such wide application areas.