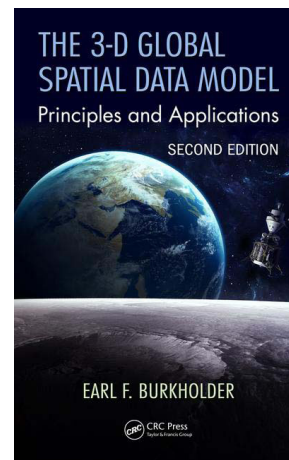


Earl Burkholder is a professional land surveyor, who, until he retired in the latter 2010, held posts at Oregon Institute of Technology and New Mexico State University. During a period of self-employment between the two academic posts, he worked on projects for the Southeastern Wisconsin Regional Planning Commission. These projects confirmed the concepts he proselytized in the first edition of *The 3-D Global Spatial Data Model: Principles and Applications*, published in 2008. Burkholder argues that point information should always be held in a 3D database and located in a three-dimensional, right-handed, rectangular Cartesian coordinate system with the origin located at the center of mass of the Earth. The XY-plane lies in the equatorial plane with the X-axis through the Greenwich meridian. The Z-axis coincides “very nearly with the mean spin axis of the Earth, as defined by the Conventional Terrestrial Pole” (p. 4). Burkholder’s Global Spatial Data Model (GSDM) concept, however, also includes mathematical concepts and procedures that can be used to work with a GSDM repository and compute geospatial information such as coordinates, distances, bearings, and azimuths in the base or other coordinate systems as required. Your reviewer, until he read the book, mistakenly thought that GSDM was some sort of formal standard, but it’s the work of the author, who writes persuasively and competently.

The concepts behind GSDM are not new, but even the basic definition advanced above hints that there is some geodesy in store. After two chapters on GSDM itself, the book continues with three solid chapters that rapidly review spatial data and the science of measurement, mathematical concepts, and geometrical models for spatial data computation. There follow five tougher chapters on geodesy – overview, geometric geodesy, geodetic datums, physical geodesy, and satellite geodesy and Global Navigation Satellite System (GNSS). The foundational material necessary to understand and work with GSDM continues with a chapter on map projections and state plane coordinates and another on spatial data accuracy. The remaining three chapters are concerned with the application of GSDM: computing a linear least squares GNSS network; computing network and local accuracy; and a series of sample projects. There are five technical appendices, the most interesting of which provide short histories of the development of GSDM and the terms “network accuracy” and “local accuracy”, and a ten-page index. For many readers, the value of the book may lie in the ten review chapters: these are best construed as a whistle-stop refresher, not an alternative to the major texts on surveying and geodesy that prospective specialists must peruse.

The book is well written and proceeds logically, though some of the review chapters move so fast, for example, the material on map projections, that their utility may be compromised. There are few typos and errors – and most of those are corrected on the website of the author’s company, Global



The 3-D Global Spatial Data Model: Principles and Applications, 2nd Edition Earl F. Burkholder

CRC Press, Taylor & Francis Group, Boca Raton, Florida. 2018. xxxii and 492 pp, 4 color and 109 black and white illustrations, tables, index. Hardcover. ISBN 978-1-4987-2216-2. \$116.00. eBook and eBook rental are also available.

Reviewed by Stewart Walker, sole proprietor, photogrammetry4u, San Diego, California.

COGO, Inc. The purpose of the book, of course, is to showcase Burkholder’s GSDM, but his palpable enthusiasm results in many repetitions of arguments. Moreover, considerable space in the last three chapters is used to reproduce computer output. This shows the GSDM resources, which are cited copiously and could be of great value to readers interested in adopting the system, but is hard to justify in an expensive hardcover book. All the referenced URLs were viewed in May 2017 – let us hope they still function.

Chapter two is new to the second edition, together with historical material on GSDM and commentary on the new horizontal and vertical definitions to be introduced in 2022 by the National Geodetic Survey. This is revealed in the preface, but the preface to the first edition is reproduced verbatim: it would have been easier on readers if the two had been combined.

Decisions on datums and coordinate systems are more like-

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ly to be taken by surveyors and geodesists in agencies at many levels from national downwards, than by photogrammetrists, remote sensors, or GIS specialists. Nevertheless, this book deserves a wide readership, not only to spur the debate on the value of GSDM, but to provide a succinct overview of modern surveying and geodesy, with an emphasis on computations of points and other quantities from surveying and GNSS data and on transformations between coordinate systems, including the important state plane ones encountered by many readers of this journal.



ASPRS is proud to partner with CRC Press, Taylor & Francis Group. We are excited to feature *The 3-D Global Spatial Data Model: Principles and Applications* and other essential books in GIS and Mapping for a discount price to ASPRS members. Visit the ASPRS Bookstore at www.asprs.org. Don't forget to apply code **ASP25** to **SAVE 25% on entire purchase* + FREE Shipping**. Can't find what you're looking for? Visit crcpress.com to shop and save on all of their books.

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