The Global Spatial Data Model (GSDM) is
Rigorous and Can be Used at Many Levels
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The 3D global spatial data model (GSDM) was developed as a tool for spatial data end users – e.g., surveyors, engineers, mappers, and GIS users. The GSDM is both simple and rigorous, is based on a single origin for 3D data, utilizes rules of solid geometry in the context of the ECEF global coordinate system, and includes both a functional model (position computations) and a stochastic model (error propagation) for determining spatial data accuracy. Although viewed skeptically by some, the defining document, 2 editions of the GSDM book, peer-reviewed papers, and numerous technical articles have demonstrated the validity of the GSDM.

The Surveying Revolution, described by Hazelton, **Part I** and **Part II**, is but a part of the current geospatial revolution characterized by the analog/digital transition. While the GSDM competently addresses spatial data infrastructure aspects of that transition worldwide, the process of abstracting technological developments may include mathematical concepts and procedures extending beyond current nominal end user applications – e.g., geometrical algebra (GA), Kalman filtering, Kriging, and specifically, the burgeoning use of artificial intelligence (AI) in applications utilizing spatial data.

Important points illustrated by a Venn Diagram (generated by Microsoft Copilot) include:
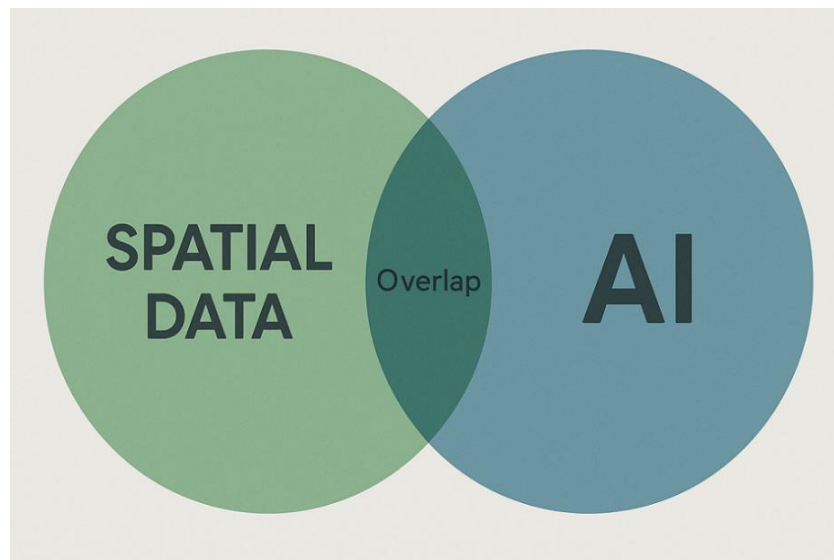

Figure 1 The GSDM includes all levels of spatial data – even AI components

1. Public domain equations of the GSDM are applicable worldwide, e.g., catching rocket boosters.
2. The GSDM provides a common data exchange format for both spatial data generators and users.
3. As shown above, end uses of spatial data exist independent of, but may be enhanced, by AI.
4. Spatial data may be part of an AI application – as such, **geometrical integrity is critical.**

The point of this memo is that the GSDM is simple, adequate, and sufficient for most (if not all) spatial data applications facing various user groups. While it would be inappropriate to ignore the issues and challenges encountered in traditional practice; it seems that too much effort is devoted to trying to fit modern spatial data into an old (horizontal/vertical) bottle model as opposed to using the GSDM as an opportunity to put new wine (3D practice) into a new 3D bottle model.