

With an overabundant selection of recent books available, it isn't surprising that many knowledgeable people are unaware of one that singularly offers original features for robustness and unprecedented situation awareness. In the words of one reviewer (a past National President and Journal editor for the Institute of Navigation), this book is teeming with insights either hard to find or unavailable anywhere else. The reason is a set of little-known connections among related items recognized from this author's

- * decades of experience in myriad facets of navigation and tracking
- * thousands of hours spent working with real airborne data
- * thorough familiarity with pertinent literature since the 1960s.

State-of-the-art GPS/INS test results, in an hour's flight with a low-cost IMU - obtained with usage of the algorithms presented in the book (free of any proprietary claims), are also included.

Have you ever in your life taken raw IMU data (rotation increments from gyros; velocity increments from accelerometers), put it with raw GPS receiver data (carrier phase and pseudorange, plus an occasional clock-cum-ephemeris nav message) and processed it all from scratch? I have, achieving state-of-the-art accuracy from drift ratings exceeding nav-quality by five orders of magnitude. Now you can do the same. Insights gained from this book will enable you to proceed with confidence, extending your knowledge in multiple directions (integration, backup, requirements definition, etc.).

You will be amazed at the directness of step-by-step procedures, giving you an entirely new depth of understanding. Gone forever is any mystery associated with presently accepted practices that retain limitations of yesteryear's technologies.

Tight integration only begins to describe the approach. Among the many available benefits not exploited by current methods (including those with tight integration) are

- * **Modern computational capabilities** vastly beyond what existed when classical algorithms were developed
- * **Full impact afforded** by frequent high-accuracy updating, whereby long-term drift is rendered ineffective by properly devised estimation - supplemented by real-world guidelines showing how far that operation can (and can't) be carried
- * **Dramatic simplifications** permissible in dynamic models when updates are separated by brief intervals (typically a few seconds)
- * **Robustness of carrier phase** used with sequential differencing – allowing omission of all integer ambiguity resolution efforts plus instant recovery from sharp discontinuities, or even intermittency, in phase data.

The result has been a wide array of innovations; well over a dozen currently unused features, easily identified, will one day be recognized as essential to meet growing demands for performance. All of the innovations appeared, prior to the book publication, in conference and journal publications written or coauthored by this writer.

The fundamental goal – maximum performance at minimal cost – plus coming as close as humanly possible to continuing operation *no matter what* – has in effect *redefined the complete methodology*. That includes not only how to process measurements from satellites – plus how to integrate them and present the outcome – but also the means, pioneered at Ohio University, of generating those measurements in the first place. The result: a combination differing radically from every other approach in existence. I feel compelled to offer this frank assessment of the status quo: Much of our industry pays a fortune for a fraction of achievable performance, doing integration in a way that is unnecessarily difficult and very incomplete. Consequences are evident from shortcomings becoming acknowledged more and more wodely throughout the industry. All those unnecessary sacrifices can be removed. This book's description of tomorrow's system-of-systems paves the way.