A-GPS: Assisted GPS, GNSS, and SBAS

By Frank van Diggelen

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Assisted GPS (A-GPS) has been developed to provide greatly improved capabilities, helping GPS work better and faster in almost any location. Offering a detailed look at all the technical aspects and underpinnings of A-GPS, this unique book places emphasis on practical implementation. The book reviews standard GPS design, helping you understand why GPS requires assistance in the first place. You discover how A-GPS enables the computing of a position from navigation satellites in the absence of precise time a topic not covered in any other book.

Moreover, you learn how to design and analyze a high sensitivity GPS receiver and determine the achievable sensitivity. The book provides detailed worksheets that show how to compute, analyze, and improve the processing gain from the input signal at the antenna to the signal after the correlators. These worksheets are used in the book to generate families of curves that completely characterize receiver sensitivity, parameterized in terms of front end noise figure, coherent and noncoherent integration times. From this work a law of achievable sensitivity is derived and explained in the book.

This cutting-edge volume discusses special forms of assistance data, industry standards for A-GPS, and government mandates for location of mobile phones. You also find coverage of future global navigation satellite systems and how they can be designed specifically for instant-fixes and high sensitivity. The book features numerous tables, worksheets, and graphs that illustrate key topics and provide the equivalent of a technical handbook for engineers who design or use A-GPS.

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Editorial Review

Review
The proliferation of Assisted GPS into consumer electronics merited an in-depth explanation of the technology and science behind it. Dr. van Diggelen, an A-GPS authority in the navigation industry, shares his wealth of academic, engineering and field experience with all of us in a truly accessible manner. Warmly recommended to all involved in building location aware products and services. --Peter-Frans Pauwels, Co-founder and CTO, TomTom

Dr. Van Diggelen has a masterpiece on his hands. He covers the topic of Assisted GPS, which will be a critical technology for a good long time. In every paragraph, his love of teaching shines through. He writes with a snap and cadence seldom found in technical writing. He also includes a "book within a book;" some 80 pages or so can be found at the beginning of the book and each chapter. These essays provide overviews to the more analytical material that follows. Enjoy. --Professor Per Enge, PhD, NAE Stanford University

Assisted GPS is a deep topic, and Frank van Diggelen has skillfully explained everything from the details of coarse-time navigation to the limits of high-sensitivity signal processing. An impressively thorough book that leaves no stone unturned. --Steve Wozniak, Fellow, Apple Inc.

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About the Author
Frank van Diggelen is the technical director of GPS systems and the chief navigation officer at Broadcom Corporation. Dr. van Diggelen is also a technical advisor of assisted GPS for NavtechGPS. He holds a Ph.D. in electrical engineering from Cambridge University, England.

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