Chapter 1
Introduction

1.1 Geolocation System

A GEOLOCATION System just like any other system requires a proper technical definition, is needed for its usage, has a progression in the present time, has a historical background and moment of conception in the past, and has a certain field of applicability and vision towards the future (see Fig. 1.1).

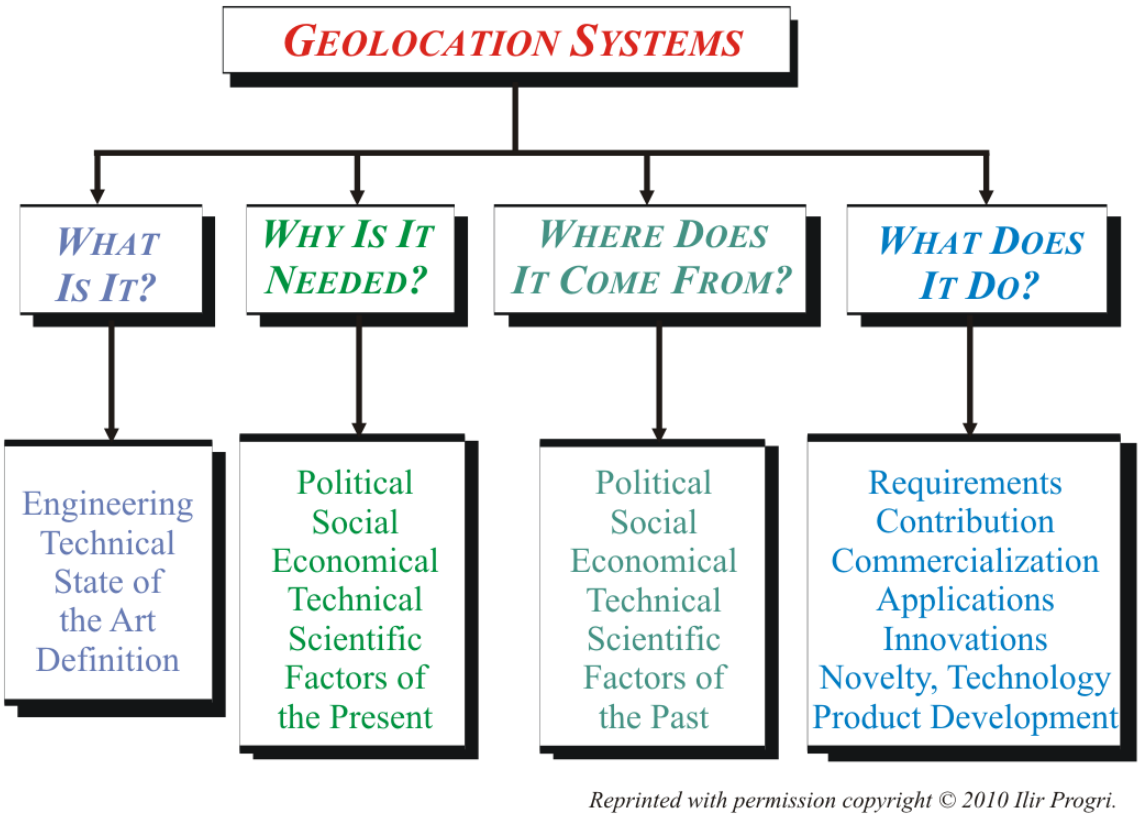

Fig. 1.1 An overview of a geolocation system. Reprinted with permission copyright © 2011 Ilir Progri.

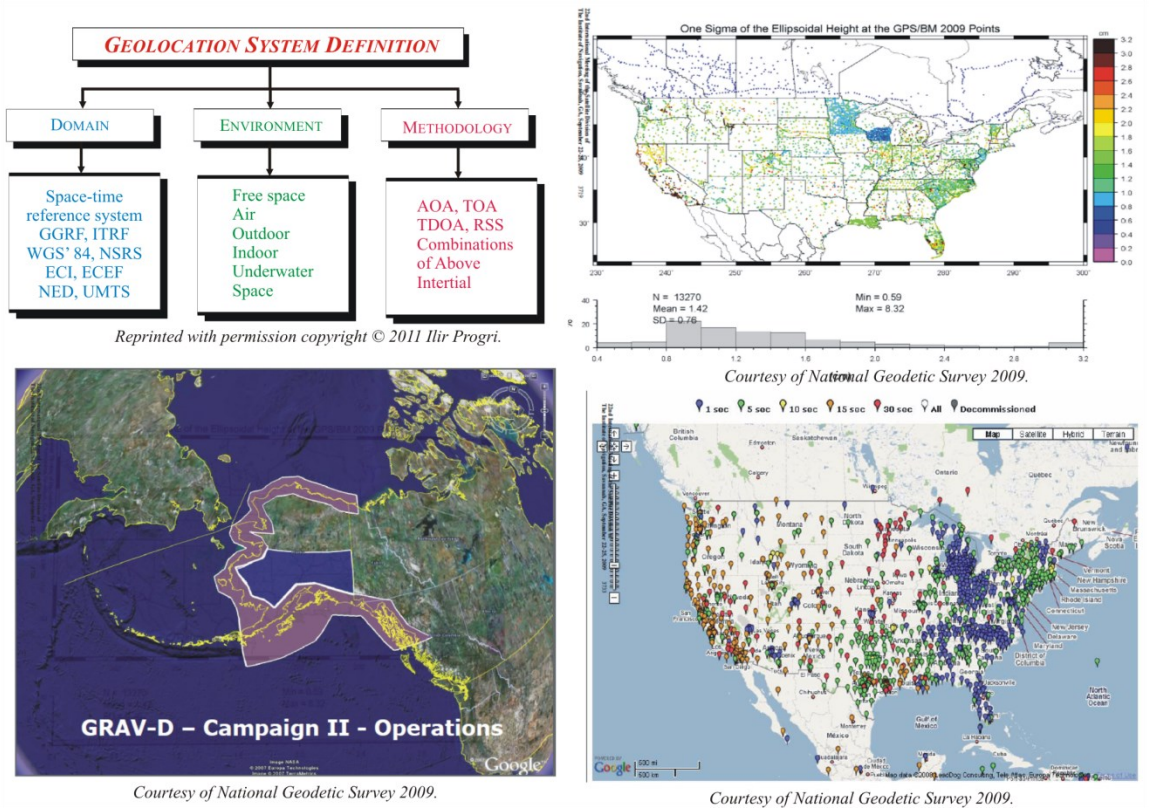

Fig. 1.2 Geolocation system main components: domain, environment, and methodology. Reprinted with permission copyright © 2011 Ilir Progri. Courtesy of National Geodetic Survey 2009 [17].

The book gathers a unique collection of block diagrams, signal diagrams of power spectrum descriptions, principle recipes, and other hard-to-find information usually treated as "principle secrets." All the best known indoor geolocation techniques are well illustrated with practical examples awaiting implementation in future military, commercial or civilian industrial products. Written in a refereed journalistic style, the book is an invaluable treatment of all aspects of indoor geolocation all-in-one source to the beginner engineer first, as well as to the more experienced professionals.

The purpose of this study is to investigate the navigation and communication properties of several candidate radio frequency (RF) signals in open indoor environments. This research can be later extended for closed indoor environments. To do this efficiently it is necessary to: (1) introduce the state of the art geolocation systems in Chap. 1; (2) classify geolocation systems architecture in Chaps. 2 and 3; (3) classify indoor geolocation systems architecture in Chaps. 4 and 5; (4) address the limitations of the some of the state of the art geolocation systems signal design for indoor applications

in Chaps. 6 and 7; (5) introduce channel models with emphasis on indoor applications in Chap. 8 and Chap. 1, II; and (6) discuss indoor geolocation systems user segment in Chaps. 2-3, II. (The detailed discussion that follows in Vol. II will be given in the introduction of II.).

1. Chapter 2: geolocation systems I classification and description.
2. Chapter 3: geolocation systems II classification and description.
3. Chapter 4: indoor geolocation system I classification and description.
4. Chapter 5: indoor geolocation system II classification and description.
5. Chapter 6: RF signals for Global Navigation Satellite Systems.
6. Chapter 7: RF signals for indoor geolocation systems.
7. Chapter 8: geolocation channel models I.
8. Volume II: indoor geolocation system advanced signal processing. Extraction of observable quantities such as position, navigation, and timing, for three Giftet Inc indoor geolocation systems (i) DSSS FCDMA, (ii) DSSS OFCDMA, and (iii) OFDMA. Qualitative and quantitative objectives on the performance requirements of a DSSS FCDMA indoor geolocation system. Qualitative and quantitative objectives on the performance requirements of a DSSS OFCDMA indoor geolocation system. Qualitative and quantitative objectives on the performance requirements of an OFDMA indoor geolocation system. Also here we will discuss maximum likelihood and Bayesian and Monte Carlo Markov Chain (MCMC) receiver.
9. Volume II: Conclusions and future work.

Other issues such as relative synchronization and implementation are not discussed in this pioneer publication.

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