بسم الله الرحمن الرحيم

شبكة المعلومات الجامعية
التوثيق الالكتروني والميكروفيلم

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

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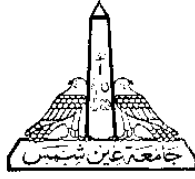
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لم ترد بالأصل

AIN SHAMS UNIVERSITY

FACULTY OF ENGINEERING

Electronics Engineering and Electrical Communications

Development of Real Time Global Navigation Satellite System Receiver

A Thesis submitted in partial fulfillment of the requirements of the degree of

Doctor of Philosophy In Electrical Engineering

(Electronics Engineering and Electrical Communications)

by

Mohamed Ibrahim Ahmed EL Hawary

Master of Science In Electrical Engineering

(Electronics Engineering and Electrical Communications)

Faculty of Engineering, Ain Shams University, 2014

Supervised By

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Cairo - (2020)

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Date:05 June 2020

Statement

This thesis is submitted as a partial fulfilment of Doctor of Philosophy in Electrical Engineering Engineering, Faculty of Engineering, Ain shams University.

The author carried out the work included in this thesis, and no part of it has been submitted for a degree or a qualification at any other scientific entity.

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Signature

………..……….

Date:05 June 2020

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Abstract

For the time being there are several Global Navigation Satellite Systems (GNSSs) in the world currently providing both navigation and timing capability. Most of the GNSSs have the same construction building in transmitter and receiver configuration. Therefore, it became important to use pliant tools in the design of the system to easily both the modernization plans of the current systems and the launching of new systems. Among the navigation satellite systems in the world are the American navigation satellite system, GPS, the European navigation satellite system, GALILEO, and GLONASS the Russian navigation satellite system. GPS is independent GNSS that provides a very precise and secured global positioning and timing capabilities under civilian supervision. It is interoperable with the European GNSS and the GNSS in Russian.

This thesis presents a modern look for the simulation and implementation of Time and Frequency GPS receiver utilizing by a graphical programming language; which is Xilinx System Generator. So, this work introduce a modern look for the SDR technology that can be accomplished via a graphical user interface environment.

The implementation of a full GPS receiver in past has been splatted into two phases. The first phase is implemented by ASIC or FPGA. This phase contains the acquisition and tracking phases and implemented by the HDL programming language. The second phase is the navigation solution phase, which implemented on DSP using C/C++, or assembly language. This clearly shows that we have to provide with two mediums to implement a full GPS receiver. The two mediums are the Simulation and implementation in FPGA mediums. In addition, using a text programming languages in writing these long and complex algorithms makes the process hard to edit, change, and understand.

This work presents the simulation and implementation of a full time and frequency GPS receiver on FPGA using a graphical programming language, that Xilinx System Generator. This makes each part of the receiver architecture much simpler and easier to learn, observe, change and edit. This can be regarded as move added to the route of open source time and frequency GPS receiver. Using the same medium in both the simulation and implementation phases makes the planners of the system use the time in growth and enhancement the algorithm. In general, this work can be seen as inserting a modern look for designing, simulating, and implementing the most complex parts of time and frequency GPS receiver on a graphical programming language, which is Xilinx System Generator.