ASEN 6091 / ECEN 5014
Global Navigation Satellite System (GNSS) Receiver Architectures

Fall Semester 2017
Classroom: ECCR 139
Meeting times: Tues & Thurs: 9:30-10:45

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Course Overview

GNSS is a generic term describing the expanding field of satellite based navigation-timing systems. The most prevalent of these systems currently is GPS which is owned and operated by the US. However, Russia maintains a system known as GLONASS. Both the European Union and China are developing their own GNSS system designated Galileo and Beidou (Compass), respectively. Lastly, there are a number of regional GNSS augmentation systems including but not limited to WAAS (US), QZSS (Japan), EGNOS (EU), India (GAGAN) each of which provides GNSS corrections and, in some cases, ranging information.

There are a multitude of GPS receivers on the market today. Oftentimes these receivers are embedded for monitoring and control and often, unfortunately, treated as a "black box". This course goes into the inner workings of a GPS receiver and also discusses features common to all GNSS receivers. The course will cover the analog radio frequency conditioning from the antenna to the analog to digital converter, then focus on the various signal processing algorithms used in GNSS receiver (acquisition, code tracking, carrier tracking, and navigation data decoding), as well as present the position-time solution. Such treatment of the operation of the receiver will provide insight into the trade-offs that go into GNSS receiver design.

The GNSS receiver is a specialized Code Division Multiple Access (CDMA) spread spectrum receiver. Thus those interested in CDMA technology will benefit from a "hands on" perspective and gain h   igati   Gt pld S t e

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