SDR-based GPS signal analyses lab

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Overview

The "SDR-based GPS signal analyses lab" is used for acquiring of knowledge about GPS signal receive and analyses. The idea of performing laboratory work is to write the necessary code on NI LabVIEW by students.

The software is developed in NI LabVIEW graphical programming environment. Clear step-by-step instructions are provided for each lab in the user manual.

Features

- Writing code on LabVIEW to perform laboratory work
- Work with advanced equipment
- Ability to record a simulated GPS signal
- Study the effect of detuning of the carrier frequency
- Study the effect of detuning of the IQ rate
- Demodulation of the navigation signal

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Required hardware and software

Hardware	Software
NI PXI platform	LabVIEW
Controller	Lab software
Vector Signal Generator	RFSG
NI USRP – 2901 or NI USRP RIO	NI GNSS Simulation toolkit
PC	NI USRP
	User manual

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List of labs

1. Learning the techniques of GPS signal simulation and record the signal for further processing
2. Receiver and transmitter carrier frequency detuning determination
3. Study of the correlation analysis of the GPS signal (C/A code)
4. Study the influence of the carrier frequency detuning at the received signal
5. Study the principle of the carrier frequency adjustment (GPS signal grabbing)
6. Study the influence of the IQ rate detuning at the received signal
7. Study the principle of the automatic adjustment of the carrier frequency (phase locked loop)
8. Study the principle of the automatic adjustment of the IQ rate
9. Demodulation of the navigation signal

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