

## Open Architecture Software GNSS Receiver

### BUILDING BLOCK SOFTWARE ELEMENTS FOR FULLY FUNCTIONAL GPS RECEIVERS

*Design, Develop and Deploy in a One-Step Process Using an  
Intuitive GUI and Software Building Blocks*

- Rapid transition from design to deployment
- Easily adapts to new applications
- Immediate comparison of different architectures
- Simplified field upgrades

CRS's modular Software GPS Receiver allows fully-functional advanced GPS receiver design, simulation, and final implementation in both real-time, as well as post-processing modes. It utilizes software building blocks similar to hardware components. The highly intuitive GUI allows the user to utilize a point-and-click interface for the development of advanced architectures. Most of the GPS related objects are already built in and several working GPS architectures are configured and read for use or modification.

The software offers high fidelity, rapid execution, scalability, doctrinally correct modules, built-in analysis, and interfaces to a variety of hardware signal sources.

The open architecture software receiver will speed development and improve accuracy using tested modular components. Faster than alternative visual environments and easier to use and share than cryptic code, the software receiver can help bring development to the next level.

The Software GPS Receiver can accept real-time data from our hardware front ends, data stored using our storage devices, or it can operate on the synthetic data derived from the GPS signal simulators.

All the software modules are written in C and C++ and can be ported into DSP, ASIC, or FPGA for real-time



applications. The complete schematic-based system can also be used for real-time applications.

The complete schematic-based system also can be used for real-time operations in a PC using available FPGA correlators (optional). Its schematic-based GUI and open architecture is based on our general purpose IMPULSE™ Electrical Engineering Simulation toolkit that allows numerous other EE product design, development, and simulation.

In conjunction with CRS's GPS Signal Simulator, the Software Receiver allows developers to rapidly design and test new GPS algorithms and techniques. Starting from several supplied model receivers, or from scratch, the user can quickly implement any development idea and test in the same software.

# Software GNSS Receiver

## FEATURES

- Software building blocks similar to hardware components (chips)
- Once the system is assembled using software building blocks, it can be simulated and tested under different user-defined conditions
- The simulated system is ready for real-time operations
- Various hardware options for real-time input/output are available
- Graphical User Interface for design and simulation
- Built-in object oriented components allow easy adjustments
- Menu-based parameter selection for most of the components
- User-defined modules and components can be easily integrated
- User-defined components can be in C, C++, Fortran, assembly, etc.
- Wizard to support the development of user-defined components
- Proprietary development of components is available
- Fully extensible, with new component packs being developed (M-code, Galileo, etc.)
- Built-in analysis tools and visualization that allows real-time feedback from any component can be used in a one-step process for design, simulation, and operation
- Simulations and runs can be saved at any point
- C/A, P(Y) code, codeless, or semicodeless models are provided

## APPLICATIONS

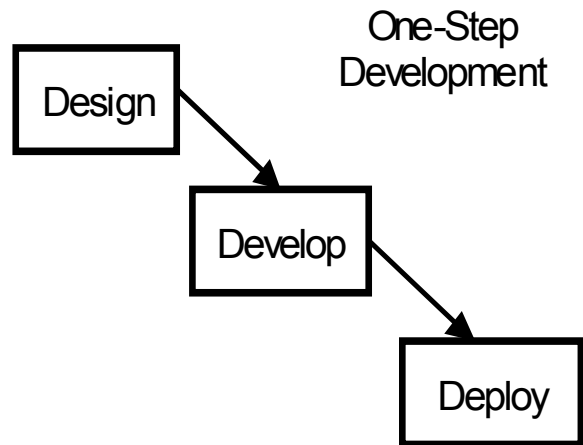
- Simulation and development
- Design and testing of new hardware systems
- Development of new waveforms and frequencies
- Adaptation to special needs
- Controlled testing using CRS's GPS Signal Simulator

## SYSTEM RECOMMENDATIONS

- Windows® 98
- 128 MB RAM
- 500 MHz Pentium® III
- 16 MB Graphics Card

## ASSOCIATED PRODUCTS

- GPS Signal Simulator
- GPS Front Ends (Downconverter, Data Logger)
- Pre-Processors
- Hard Disk Based Data Storage System
- Complete Self-contained platform for real-time operation is available



## GPS SOFTWARE RECEIVER EXAMPLE

### APPLICATIONS

- Fast acquisition using FFT
- Scintillation mitigation
- Interference and jamming operation
- High dynamics
- Multipath minimization
- Space-time fluctuation mitigation using STAP processing
- Architecture development and implementation for new frequencies ( $L_5$ ) and systems (Galileo)
- Coded and codeless operation
- Joint detection and tracking with smoother processing
- Covert operation
- Direct Y-code acquisition
- Operation under degraded S/N conditions

### DIGITAL STORAGE RECEIVER

- Direct Y-code acquisition
- Sequential C/A code detection as a counter to Gold code jamming
- Joint detection and tracking with smoother processing
- Synthetic and high gain antenna nulling
- Snapshot processing for location or stealth processing
- Real-time kinematic processing and robust elimination of multipath effects