GPS Simulation

GPS Front End

CRS has developed entirely software-based single and dual-frequency GPS receivers, a GPS single simulator, and various other associated software modules and hardware units. The software modules allow easy configuration of improved GPS receiver architecture, design, and development. A graphical user interface is provided for the ease in designing and developing new and improved architectures.

The modules are based on CRS's Windows®-based IMPULSE™ Software System for the development of complex systems. It offers high fidelity, rapid execution, scalability, interface to doctrinally correct modules, and built-in analysis.

The software GPS modules can be configured as an excellent simulator for the development of new and improved GPS receivers. Once the simulation is completed, the software modules (in tuned C) can be directly implemented in host processors (PC, DSP, FPGA, or ASIC) for real-time applications. All the necessary modules are available.

Developed under SBIR funding for ONR, the Open Architecture Receiver allows the use of buildingblock hardware and software modules to construct fully functional GPS receivers in a matter of minutes. This allows for the rapid prototyping and production in a one-step process.

GPS PRODUCTS: SOFTWARE SUITE

FEATURES

- Fully open architecture

- C/A code, P code, codeless, or semicodeless operation

- Single, dual, or multiple frequency (L_5 capable)

- Multiple antennas allow STAP type processing (for multipath,interface, etc.)

- Ability to visualize signals from any module

- Building blocks are based on tuned C code, allowing real-time implementation (PC, DSP, FPGA, or ASIC)

Various hardware modules compatible with the softwarebased system are available.

ADVANTAGES/SOFTWARE GPS RECEIVER

- Rapid transition from design to implementation

- Easily adapted for new applications

- Immediate comparisons of different architectures during development

- Simplified upgrades

1. GPS Receiver Front Ends: Available for single, dual, and multiple frequencies and with multiple antennas. LNAS and various antennas (L_1, L_2, L_5, single element, and multiele ment) are available.

2. GPS Data Logging System: RAM or disk-based data recording at up to 120 MBPS on L_1 and L_2.

3. Hardware pre-processors (FPGA correlators, DSP preprocessors, etc.) for real-time Receivers: Hardware modules are high modular, allowing the users to mix and match various building blocks in order to optimize the desired performances. The modularity offers flexibility, compatibility, future upgrades, and prevents obsolescence.

   A self-contained platform for real-time operation including FPGA correlators, processors, downconverters, and software tools are available.

One-Step Development: Design → Develop → Deploy
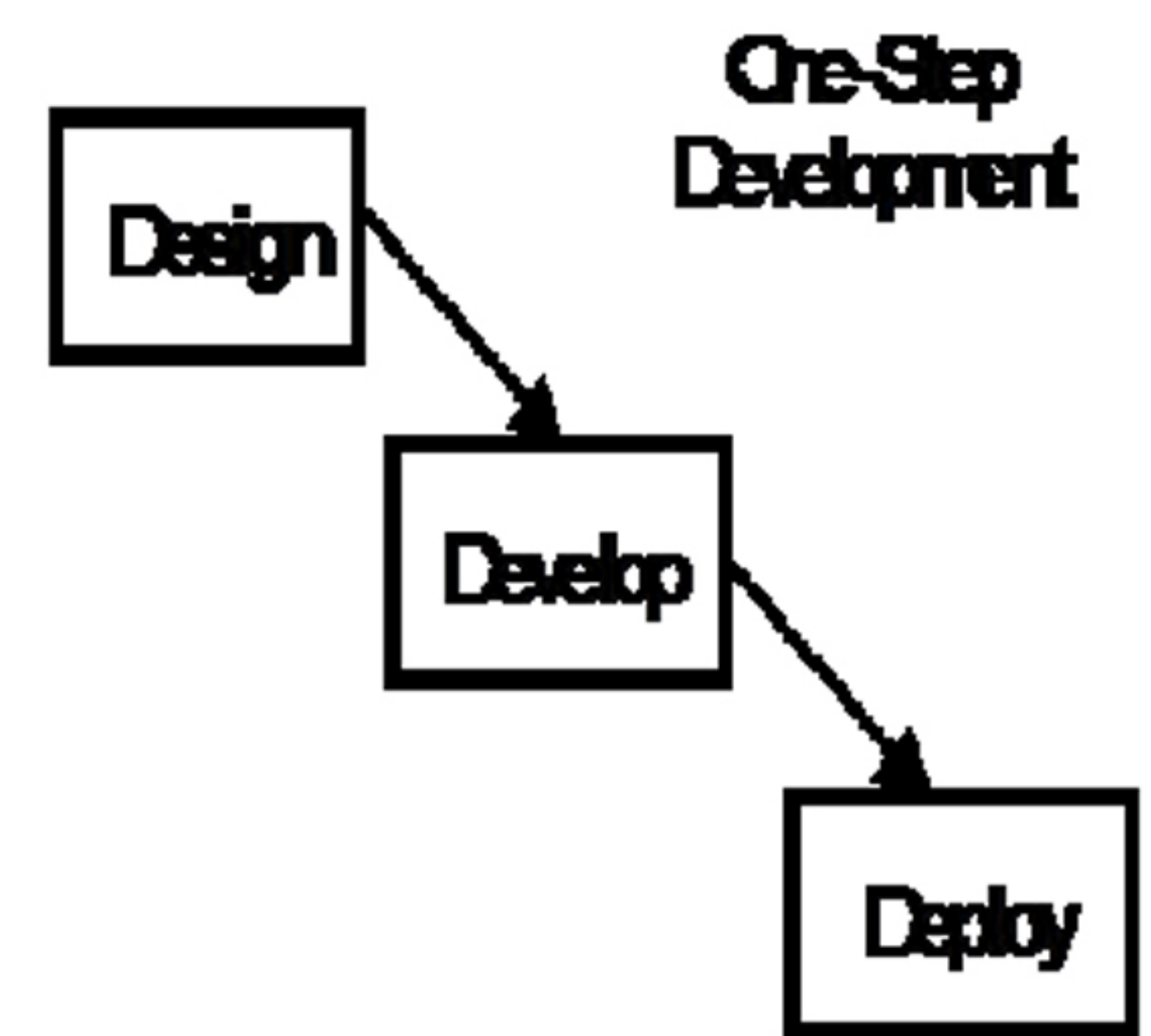
SIGNAL SIMULATION
Software-based Real-Time Simulators

The open-architecture software system allows the simulation of GPS signals under a variety of conditions in an extremely convenient manner. The schematic-based system can be used to simulate signals from multiple satellites. It can be used to synthesize the signals at any location on earth or in space. Multiple antennas can be simulated. It can be used to model various effects such as: scintillation, interference, and jamming; narrowband, wide-band, and directional; high-dynamics, specified orbits, wavefront simulation at multiple antenna locations, plasma re-entry bodies, obscuration, multipath effects, and ocean scattering.

The full GPS constellation for both L_1 and L_2 are available. M-code simulators are available. All the necessary modules for user-defined systems are provided.

Modules of GLONASS, Galileo, L_5, and C/A on L_2 are under development.

Real-time hardware-based signal simulatorsutilize similar features as software-based simulations. In addition, it provides real-time RF signals at L_1 and L_2, allows wavefront simulation, high dynamics, and hardware in the loop operations. Excellent fidelity and a convenient GUI are provided.

In conjunction with the Digital Storage and Replay Unit, the software signal simulator can be used to provide live RF signals for conditions that are not possible with conventional simulators.

Complete Dual Frequency GPS Receivers for advanced applications are available.