

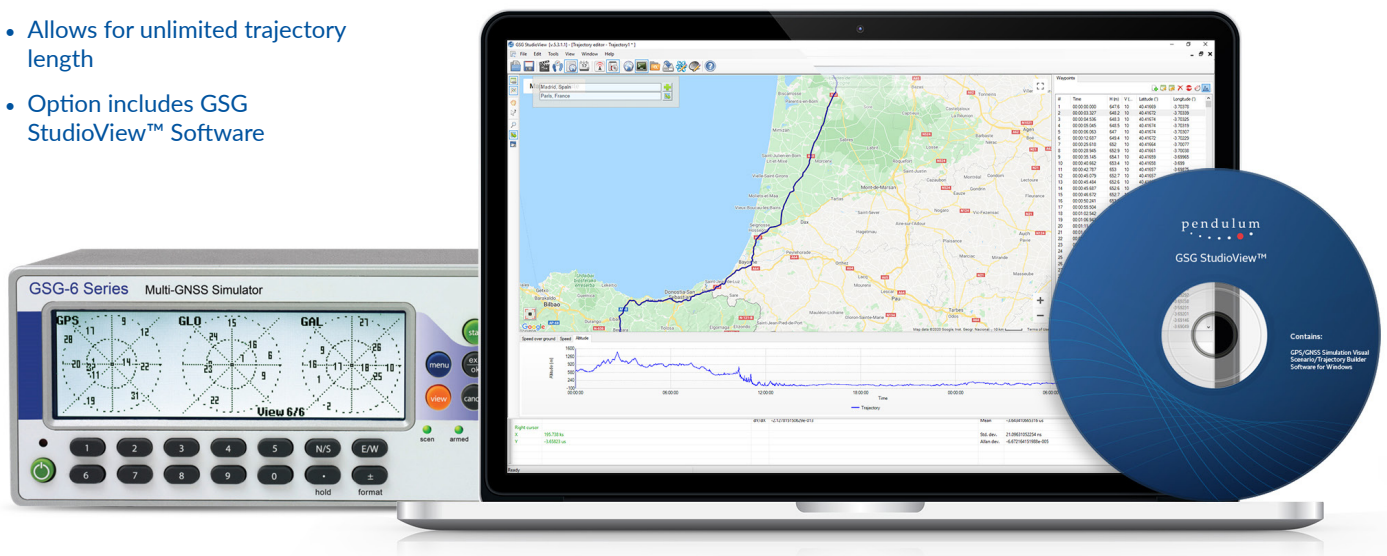
# Real-time Scenario Generation

## Easy Integration for Hardware-in-the-Loop (HIL) Testing

pendulum

### DATA SHEET

- Real-time input option for GSG Series GNSS simulators
- Integrated INS+GNSS Receiver testing
- Control Trajectories using 6DOF
- Low fixed latency from command input to RF output; low jitter
- Allows for unlimited trajectory length
- Option includes GSG StudioView™ Software



The Real-time Scenario Generation (RSG™) option for the GSG products supports fixed latency streaming of 6DOF trajectory information via position, velocity, acceleration, or heading commands. Vehicle attitude and attitude changes, as well as satellite power levels, are also controllable via real-time commands. The RSG option allows the input of real time trajectory data from external devices or software via commands which support setting position, velocity, acceleration, orientation, or heading independently. This allows for external control of all or some of these parameters depending on your simulation needs or capabilities. See Figures 1, 2, and 3.

### Interface

The RSG option takes advantage of the NI VISA driver and SCPI protocol to allow data to be streamed in from numerous sources including external software programs and GSG StudioView™ software. This approach allows the flexibility to choose the most convenient of either standard interfaces provided on the GSG Series Simulators, USB or Ethernet. For the best performance, USB is preferred.

### Hardware-in-the-loop Integration

The GSG Simulator with the RSG option is easily integrated into a Hardware-in-the-Loop (HIL) test system. The simulator will provide feedback for underflow and overflow conditions to easily allow error detection. The fixed latency allows for easy system wide compensation.

### Enhanced Trajectory Capability

The RSG option expands on the powerful trajectory options for the GSG Series Simulators. This option allows trajectories of unlimited duration to be streamed into the simulator making the file size limitation for trajectories inapplicable. Trajectories are now also specified in this new format that makes creation of high dynamic trajectories simple and convenient.

## Specifications

- Update Rate: up to 10 Hz, uniform periodic or non-uniform
- Latency: 100 ms + [30 – 100 ms] fixed delay that can be driven to minimum by synchronizing the command inputs to the GSG's 10 PPS epoch timing signal
- Latency Jitter: 1-5 ms typical

## Controlled Parameters & Status

- Satellite Power level
- Position (Geodetic Latitude/Longitude/Altitude or ECEF X,Y,Z)
- Heading
- Heading Rate of Change
- Velocity (East/North/Up, ECEF, Speed over Ground, or vertical)
- Acceleration (East/North/Up, ECEF, heading or vertical)
- Pitch/Roll/Yaw
- Pitch/Roll/Yaw Rate of change
- Command completion status
- Command Overflow and Underflow status

## Interfaces

- Trajectory data input via Ethernet or USB (USB preferred)
- National Instruments VISA bus driver and LabView support
- SCPI commands and queries. See detailed Interface Specification document for more information.
- Conversion utilities available, please consult your Pendulum account representative

## Ordering Information

**OPT-RSG:** A license file is provided to enable this feature on a GSG Series Simulator. This license is tied to the serial number and the option must be purchased for each simulator. A full GSG StudioView™ software license is included with this option.

## Hybrid GNSS+INS Navigation Testing

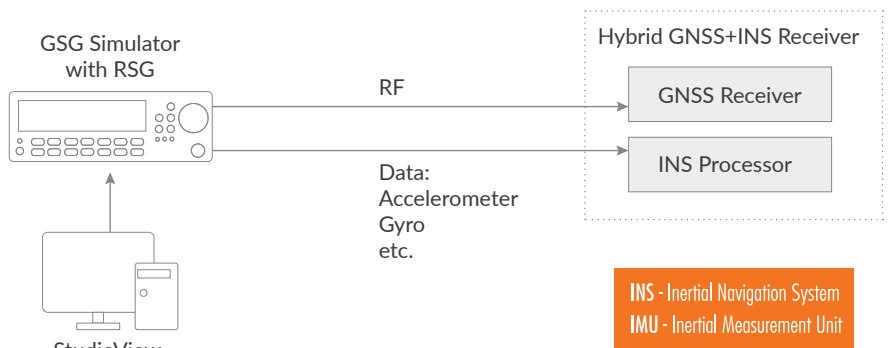


Figure 1: Testing a hybrid GNSS+INS navigation device where StudioView creates the scenario.

## Testing with an Existing Simulator

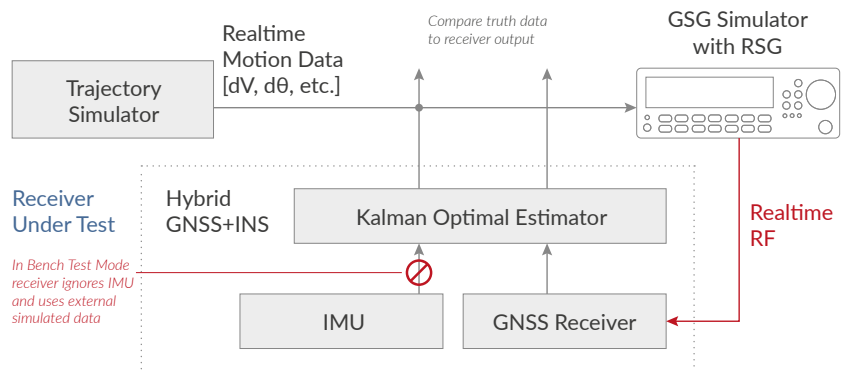


Figure 2: Typical use case scenario when testing with an existing trajectory simulator.

## Inertial Test Stand or Drive Testing

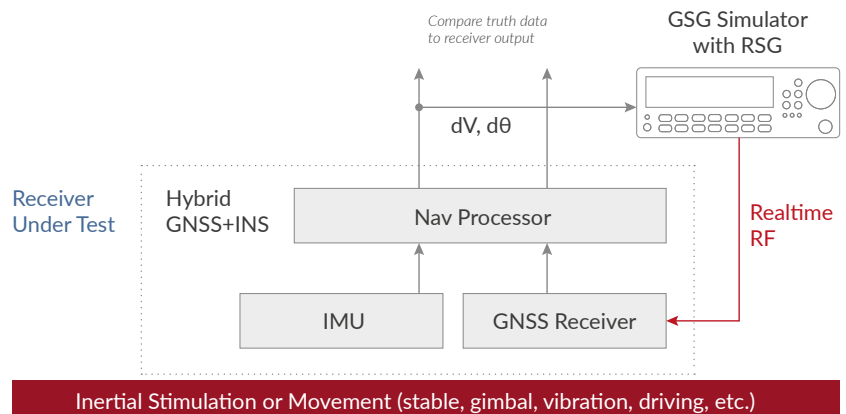


Figure 3: Typical use case scenario when receiver under test is placed on inertial stimulation stand.