

**Model 1107 Radar Target Simulator** is capable of producing a moving target, with appropriate target cross-section, propagation loss and a dynamic range of over 100 dB.

#### Typical System Performance

- Frequency Range: 0.1 to 18 GHz
- Target Range: 0 to 160 km
- Step Size: 100 m
- Doppler: 0 to 50 kHz in 1 kHz steps
- Full spectrum analysis
- Optical Tap
- Removable Hard Drive
- Interferer Injection (Jammer)
- Target Speeds to 10,000 MPH

**Configure Now**



# Model 1107



Global Provider of Test & Measurement Solutions



## Model 1107 Radar Target Simulator Unit

Eastern OptX Model 1107 Radar Target simulator is engineered to replicate real-world signal propagation with a level of fidelity that conventional simulators cannot achieve. Rather than generating synthetic targets or signals, the system processes the user's actual radar pulse and applies the critical parameters encountered in real operational environments. These include precise time delay to emulate target distance, path loss associated with signal propagation, Doppler frequency shifts corresponding to target velocities up to 5,000 mph, and radar cross-section effects that accurately model target size and reflectivity. The result is a highly realistic representation of how a radar signal interacts with dynamic targets, enabling more accurate system validation and performance testing.

Users can define and execute complex target scenarios through an intuitive interface, specifying parameters such

as range, velocity, and target signature. Each scenario includes a preamble with radar-specific characteristics—such as pulse width and repetition rate—allowing the system to seamlessly synchronize state changes between pulses without detection by the radar under test. The simulator supports both automatic triggering via detected radar pulses and external trigger inputs, while continuously monitoring and recording signal activity throughout the test. Integrated analysis capabilities, including a full-bandwidth spectrum analyzer and comprehensive data logging, provide immediate insight into both system performance and scenario execution. With built-in self-test routines, optional NIST-traceable calibration, and detailed post-test comparison tools, the platform ensures confidence in both the simulator's accuracy and the radar system's operational readiness.

DS-0024 Rev 2



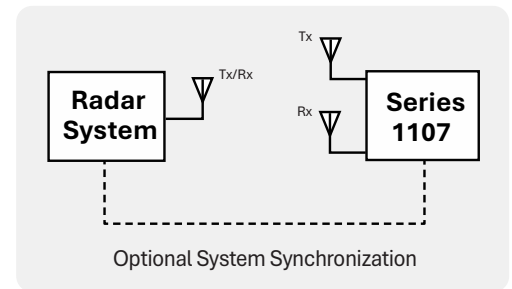


# Model 1107 Radar Target Simulator Unit



## System Description

The block diagram shows a typical 1107 System used with a common antenna radar system. The 1107 receives the signal transmitted from the radar, provides the necessary target delay, propagation loss, and Doppler, and then transmits back to the radar receiver. 60 dB of Input to Output Isolation is typical for most applications. Greater isolation is optional. Single antenna systems with octave band isolators are also available for specific radar bands. Direct RF connection to Radar and 1107 without external antenna is permissible and common. The System Operates with single antenna or phased array systems. Optional multiple target generation is available with single or multiple output emissions.



## Features

- Replicates target distance and speed
- Target distances from 0 to 160 km in 100 m steps.
- Doppler frequencies from 0 to 50 kHz
- High Speed Target scenario generation (All switching between radar pulses)
- Easy to use GUI with front panel touchscreen
- Remote Control Interface via SCPI commands
- Built-In Self Test
- Signal spectrum analysis
- Interferer Injection (Jammer)
- Broadband performance (to 40 GHz)

| Parameter                   | Specifications                         | Notes                               |
|-----------------------------|----------------------------------------|-------------------------------------|
| Input/Output Isolation      | 60 dB                                  | Minimum                             |
| Accuracy                    | 1 %                                    | Optional 0.5%                       |
| Repeatability               | 0.1%                                   | At constant temperature             |
| Minimum System Loss         | 0.5 dB/km                              | Typical, @ 5 GHz                    |
| VSWR                        | 2 : 1                                  | Maximum                             |
| Spurious Free Dynamic Range | 100 dB/Hz <sup>2/3</sup>               | Minimum                             |
| 1 dB Input Compression      | -15 dBm                                | Minimum                             |
| Noise Figure                | 25 dB (13 dB Typ.)                     | Maximum (Lower NF optional)         |
| Input/Output Impedance      | 50 Ω                                   | Nominal                             |
| Dimensions                  | 19" Rack Per EIA-310-D                 | 12U, 18" to 22" depending on design |
| Power Supply                | 120 VAC - 60 Hz, or<br>230 VAC - 50 Hz | Alternates Available                |





# Model 1107 Radar Target Simulator Unit



## Software - Main System Control User Interface

Delay Selection   Propagation Loss Selection   Doppler Frequency Selection   Doppler Bypass Selection   Scenario Diagnostics

Control-Status   Scenario   Graph   System

**Manual Control**

Delay:    Doppler Freq:

Loss AT1:    Doppler Bypass:

**Scenario Control**

**Scenario Status**

State:    Elapsed Time:

Avg Pulse Width:    Avg Pulse Rate:

Pulse Count:    Missing Pulses:

Counts

PW (s)

Scenario Control (Do not start Scenario without first verifying that a Scenario is loaded (See Scenario Tab))

Pulse record histogram for each run. Shows the value and number of all pulses accepted by the system

## Software - Scenario Interface Overview

Pulse Repetitive Interval   Pulse Width   Delay between trigger start and Scenario start   Scenario Definition

Control-Status   Scenario   Graph   System

**Header**

| Parameter            | Value    |
|----------------------|----------|
| PRI_s                | 100.000m |
| PW_s                 | 20.0000m |
| TrigDelay_s          | 0.00000  |
| PrePulseUpdateRate_s | 100.000m |
| PulseTimeout_s       | 130.000m |
| PulseWindow_s        | 0.00000  |

Current Scenario:

**Table**

| Time(s) | Delay(s) | Loss AT1(dB) | Doppler (Hz) | Loss AT2(dB) |
|---------|----------|--------------|--------------|--------------|
| 0.00000 | 300.000n | 0.00000      | -50.0000k    | 0.00000      |
| 60.0000 | 300.000n | 0.00000      | 50.0000k     | 0.00000      |

Pulse Width Buffer   Pulse Timeout   System Update rate prior to first pulse detection





# Model 1107 Radar Target Simulator Unit



## Software - Graphical User Interface Overview



This screen shows the Radar Target Scenario selected by the user in tabular form. The user may load new Scenarios from this screen. Be sure to load a Scenario before selecting the “Start Now” key on the Control-Status Tab.

## Software - Scenario Plan and Process Graph



This screen shows the Radar Target Scenario selected by the user in tabular form. The user may load new Scenarios from this screen. Be sure to load a Scenario before selecting the “Start Now” key on the Control-Status Tab.

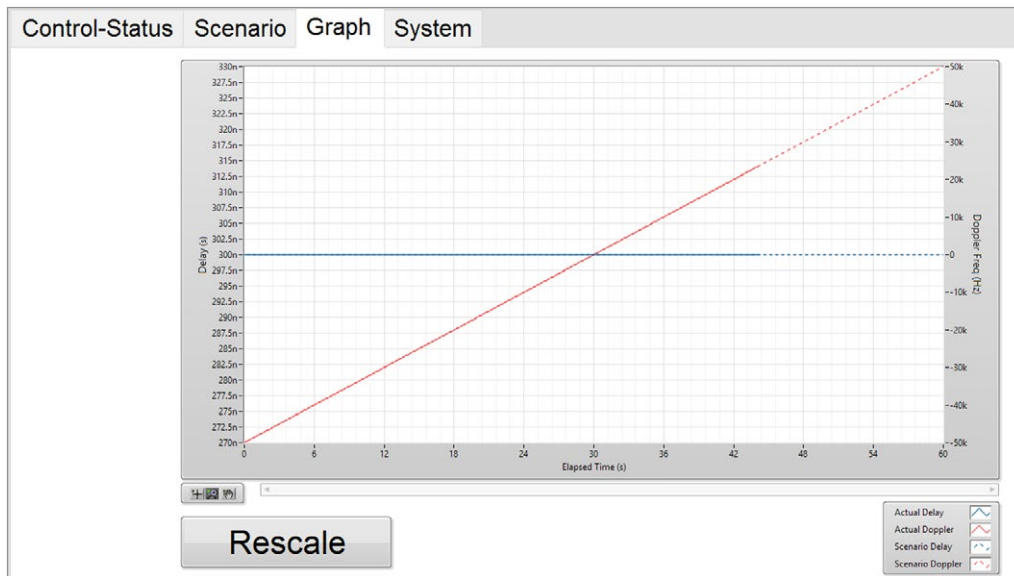




# Model 1107 Radar Target Simulator Unit

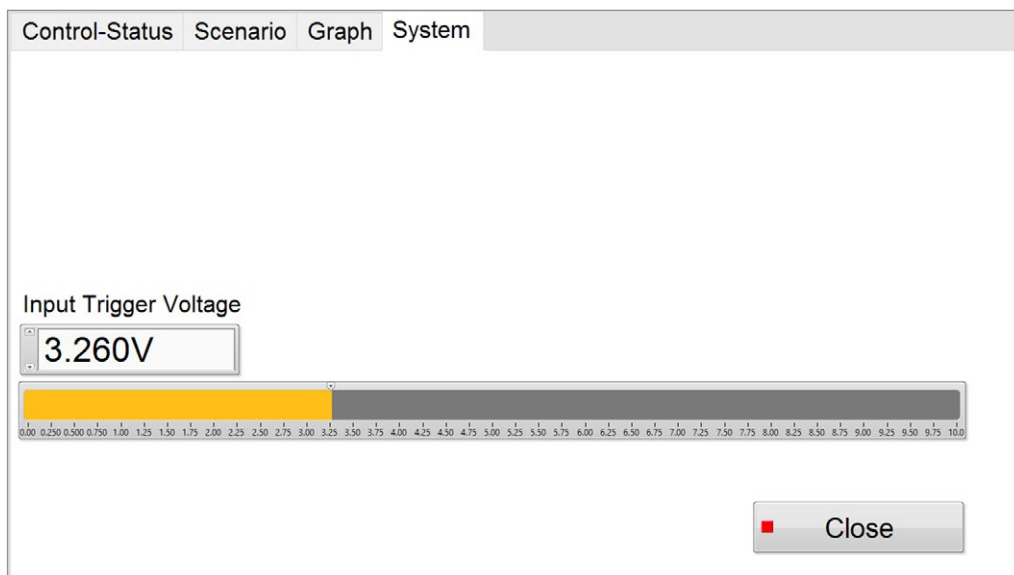


## Software - Scenario Plan and Process Graph



This plot shows graphically the user defined Scenario including Delay, Doppler, and Propagation Loss. Once the “Start Now” key on the Control-Status Tab is selected the plot will also show the actual values as the Scenario progresses.

## Software - System Control Tab



The user can enter an input trigger voltage, which is the voltage level of the detected radar pulse, below which the system will ignore. The system will detect the radar pulse and perform all switching operations between the end of the detected pulse and the start of the next pulse based on the user-defined pulse repetition interval.

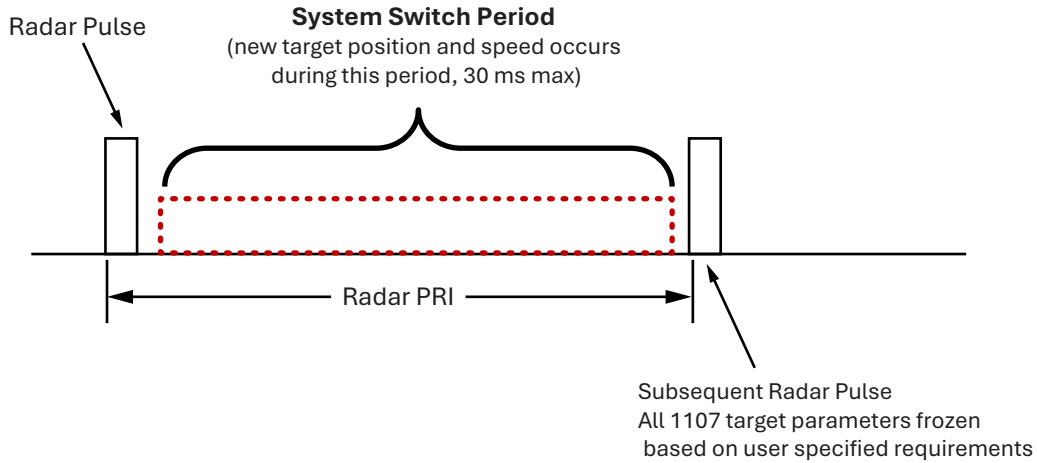




# Model 1107 Radar Target Simulator Unit



## Model 1107 Simulator Timing Diagram



## Model 1107 Block Diagram

