RADAR TARGET GENERATOR RTG
The RTG (Radar Target Generator) is part of the RASS-S test equipment suite and is designed to generate primary radar returns. It can be placed in the field (Remote Test Target) or connected to a radar (on site target injection).

In all cases, the RTG will detect and preserve the radar pulse, apply a fixed and highly precise delay and retransmit the pulse with the appropriate power, pulse-width, frequency and Doppler shift. This is a high fidelity simulation of real targets and allows for precise scenarios for testing.

The following versions are available:

<table>
<thead>
<tr>
<th>Frequency band</th>
<th>Frequency range</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTG1002 L/S band</td>
<td>1001MHz .. 3450MHz</td>
</tr>
<tr>
<td>RTG1062 C band</td>
<td>4200MHz .. 6400MHz</td>
</tr>
<tr>
<td>RTG1063 X band</td>
<td>8.7GHz to 10.5GHz</td>
</tr>
<tr>
<td>RTG1085 UHF band</td>
<td>400MHz to 460MHz</td>
</tr>
</tbody>
</table>

The listed RTG versions all have the same look-and-feel and are used in a similar way.

For **Remote Test Target (RTT)** usage the RTG is deployed in the field, typically connected to two log periodic antennas. The radar antenna system is tested in this way as well. The simulated target can be fixed or moving radially. The fixed target can appear as point clutter (no Doppler) or can have a simulated Doppler frequency.

For **on site target injection** the RTG is directly connected to the radar. In this way multiple targets can be generated in various directions on top of the existing radar environment and the current clutter situation. Targets can be programmed freely with any speed or RCS as long as there is only one target generated per beam dwell. A 2nd RTG can be used to test the resolution of the radar (resolving a two-target overlap). The vertical antenna diagram can be loaded from a file for simulation. If the radar has two antennas on reception, like most of the ATC radars, these two beams can be simulated simultaneously.

**Product Highlights**

- A correct Doppler is guaranteed on all frequencies even in agile mode. This is very advantageous on radar systems that resolve the Doppler ambiguity, on different frequencies.
- The computer with the application software is built in the 19 inch enclosure of the RTG.
- Interfacing is done with a network cable. The built in computer has two network connectors and thus can easily be controlled over a remote desktop connection.
- The RTG has a serial input for UTC timestamping (NMEA protocol) from either a time server or from a GPS.
- The RTG can measure the frequency of the received pulses which will make the output power more accurate, because the output power is equalised vs frequency.
- There is a correction table available where the user can enter the cable losses of the setup versus frequency.
- The RTG can modulate the output power according to the received input power (adaptive beam modulation), even when the radar operates with frequency agility.
### General Specifications for the 4 RTG versions

#### INTERFACES

- **RTG Interfaces**
  - **ETHERNET**
    - Ethernet connection to control the RTG1002 hardware.
  - **GPS**
    - DB9 connector, NMEA protocol, Meinberg compatible
      - UTC Time stamp ARP during on site target injection
      - UTC Time stamp target range (±100ms interval)
  - **SERIAL**
    - Engineering interface for development only
  - **RASS (2)**
    - RASS-bus: interface for encoder signals, trigger out and Gate output

- **Embedded PC Interfaces**
  - **Network (2)**
    - Local embedded PC network connection
  - **DVI**
    - Digital Video Interface, display output
  - **USB2.0 (2)**
    - USB connection for keyboard and mouse

#### POWER REQUIREMENTS

- **Power supply**
  - 85-264VAC/47-440Hz or 120-370VDC
  - Fused with 1.6A

#### MECHANICAL SPECIFICATIONS

- **Dimensions**
  - 435x128x363 WxHxD(mm), 19” enclosure
- **Weight**
  - 30kg; RTG packed in black pelicase, incl. accessories, display, keyboard and mouse

### Specifications RTG1002

#### RTG1002 CONNECTORS

- **Rf Input Rx**
  - +10dBm .. -35dBm
  - 1001MHz .. 3450MHz
  - Accuracy <1dB
- **Rf Input Monitor**
  - Output for monitor purposes = Rx input - 8dB
- **Digital Delay Out**
  - Delayed signal, unequalized
- **Modulator 2 In**
  - Maximum input level +10dBm, +30dBm no damage
- **Modulator 2 Out**
  - Equalized output vs freq. maximum output level 0dBm
- **Rf Output Tx**
  - Equalized output vs freq. maximum output level 0dBm
- **Generator Out**
  - Output of white noise generator, -10 dBm maximum integrated output power

#### TARGET SPECIFICATIONS

- **Range**
  - Min. 36m, max. 701km
- **Range resolution**
  - 21.4mm (sampling at 7GHz)
- **Range accuracy**
  - Bias 0.1m linearity 0.5ppm
- **Output power**
  - Min. -100dBm, max 0dBm
- **Max speed**
  - 8190m/s

### Specifications RTGC1062

#### RTGC1062 CONNECTORS

- **Rf Input Rx**
  - +5dBm .. -35dBm
  - 4200MHz .. 6400MHz
  - Accuracy <1dB
- **Rf Input Monitor**
  - Output for monitor purposes = Rx input - (3→6)dB
- **Digital Delay Out**
  - Delayed signal, unequalized
- **Modulator 2 In**
  - Maximum input level +10dBm, +30dBm no damage
- **Modulator 2 Out**
  - Equalized output vs freq. maximum output level 0dBm
- **Rf Output Tx**
  - Equalized output vs freq. maximum output level 0dBm
- **Generator Out**
  - Output of white noise generator, -10 dBm maximum integrated output power
- **Modulator 2 used as Attenuator**
  - Min < -80dB, Max Power out 0dBm (±1.85dB accuracy)

#### TARGET SPECIFICATIONS

- **Range**
  - Min, 36m, max, 701km
- **Range resolution**
  - 21.4mm (sampling at 7GHz)
- **Range accuracy**
  - Bias 0.1m linearity 0.5ppm
- **Output power**
  - Min. -90dBm, max 0dBm
- **Max speed**
  - 8190m/s
- **Doppler and speed resolution**
  - 0.25m/s
- **Dynamic range out**
  - 100dB
- **Output Amplitude resolution**
  - 0.5dB
- **Output Amplitude accuracy**
  - 1dB for power between 0 dBm and -80dBm
- **Amplitude ripple**
  - Measured with 1MHz RBW 95 percentile < 0.20 dB average 0.1 dB
- **Doppler and speed resolution**
  - 0.25m/s
- **Dynamic range out**
  - 100dB
- **Output Amplitude resolution**
  - 0.5dB
- **Output Amplitude accuracy**
  - 1dB for power between 0 dBm and -80dBm
- **Amplitude ripple**
  - Measured with 1MHz RBW 95 percentile < 0.20 dB average 0.1 dB
### Specifications RTGX1063

<table>
<thead>
<tr>
<th>RTGX1063 CONNECTORS</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>RF Input Rx</td>
<td>+5dBm .. -35dBm</td>
</tr>
<tr>
<td></td>
<td>8.7GHz to 10.5GHz</td>
</tr>
<tr>
<td></td>
<td>Accuracy &lt;1dB</td>
</tr>
<tr>
<td>RF Input Monitor</td>
<td>Output for monitor purposes = Rx input +2dB</td>
</tr>
<tr>
<td>Digital Delay Out</td>
<td>Delayed signal, unequalized</td>
</tr>
<tr>
<td>Modulator 2 In</td>
<td>Maximum input level: -10dBm, +30dBm no damage</td>
</tr>
<tr>
<td>Modulator 2 Out</td>
<td>Equalized output vs freq. maximum output level 0dBm</td>
</tr>
<tr>
<td>RF Output Tx</td>
<td>Equalized output vs freq. maximum output level 0dBm</td>
</tr>
<tr>
<td>Generator Out</td>
<td>Output of white noise generator, minimum -10 dBm integrated output power</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TARGET SPECIFICATIONS</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Range</td>
<td>Min. 45m, max. 701km</td>
</tr>
<tr>
<td>Range resolution</td>
<td>21.4mm (sampling at 7GHz)</td>
</tr>
<tr>
<td>Max speed</td>
<td>8190m/s</td>
</tr>
<tr>
<td>Doppler and speed resolution</td>
<td>0.25m/s</td>
</tr>
<tr>
<td>Dynamic range out</td>
<td>90dB min</td>
</tr>
<tr>
<td>Amplitude resolution</td>
<td>0.5dB (±1dB accuracy)</td>
</tr>
<tr>
<td>Output Amplitude resolution</td>
<td>1dB for power between 0 dBm and -80 dBm</td>
</tr>
<tr>
<td>Amplitude ripple</td>
<td>Measured with 1MHz RBW</td>
</tr>
<tr>
<td></td>
<td>95 percentile &lt; 0.36 dB</td>
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<tr>
<td></td>
<td>average 0.11 dB</td>
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### Specifications RTGU1085

<table>
<thead>
<tr>
<th>RTGU1085 CONNECTORS</th>
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<tbody>
<tr>
<td>RF Input Rx</td>
<td>+10dBm .. -40dBm</td>
</tr>
<tr>
<td></td>
<td>400MHz to 460MHz</td>
</tr>
<tr>
<td></td>
<td>Accuracy &lt;1dB</td>
</tr>
<tr>
<td>RF Input Monitor</td>
<td>Output for monitor purposes = Rx input -8dB</td>
</tr>
<tr>
<td>Digital Delay Out</td>
<td>Delayed signal, unequalized</td>
</tr>
<tr>
<td>Modulator 2 In</td>
<td>Maximum input level: +10dBm, +30dBm no damage</td>
</tr>
<tr>
<td>Modulator 2 Out</td>
<td>Equalized output vs freq. maximum output level 0dBm</td>
</tr>
<tr>
<td>RF Output Tx</td>
<td>Equalized output vs freq. maximum output level 0dBm</td>
</tr>
<tr>
<td>Generator Out</td>
<td>Output of white noise generator, -10 dBm maximum integrated output power</td>
</tr>
</tbody>
</table>

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<tr>
<th>TARGET SPECIFICATIONS</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Range</td>
<td>Min. 500m, max. 5600km (UHF version with extended range)</td>
</tr>
<tr>
<td>Range resolution</td>
<td>171mm</td>
</tr>
<tr>
<td>Output power</td>
<td>Min -100dBm, max 0dBm</td>
</tr>
</tbody>
</table>
OUR PHILOSOPHY

FROM TOP TO BOTTOM
FROM ANTENNA TO CENTER
FROM PILOT TO CONTROL

FROM CHALLENGE TO RESULTS