PhantomRF Product

PhantomRF is an advanced, customizable digital radio frequency memory (DRFM) target generator from Dynetics. PhantomRF is capable of generating high-fidelity false targets as well as implementing sophisticated and responsive electronic attack (EA) techniques, making it an ideal and affordable platform for radar test and evaluation programs and electronic protection (EP) testing.

PhantomRF Services

Radar HWIL demonstration: In addition to verifying performance with RF test equipment, Dynetics performs extensive hardware-in-the-loop (HWIL) testing with a laboratory Doppler radar. This allows customers to observe their systems' execution of required EA techniques in range-Doppler map displays before delivery, lowering integration risk.

Integration support: PhantomRF includes a user manual and a network interface control document (ICD) to facilitate integrating the DRFM into a larger system. Dynetics personnel support integration activities on-site, reducing integration time and risk.

## Specification | Value | Benefit
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Instantaneous bandwidth | 1+ GHz | Supports testing with frequency agile and high-range resolution radar systems
Sampling | 2.5 GHz sampling, 14-bit ADC, 16-bit DAC | Provides high-fidelity reproduction of radar waveform, high dynamic range for test flexibility
Intermediate frequency (IF) | 1.375 to 2.375 GHz | Second Nyquist zone sampling facilitates excellent spectral purity in radio frequency (RF) downconversion/upconversion
Target range/delay | 1 to 32 simultaneous targets; 500ns to 4.5ms target delay; 75m to 675km target range | Provides flexible target generation
System features | Built-in self test; self calibration; health/status messages; external or self-driving triggering; network ICD | Provides easy system status verification, calibration, triggering, and integration
EA techniques supported | Coherent: multiple false targets, range gate pull-off (RPGO), velocity gate pull-off (VGPO), coordinated range/velocity gate pull-off/pull-in false targets, range denial, head-to-tail repeating pulse, Doppler noise  Non-coherent: narrowband/wideband noise, cover pulse | Flexible technique generation for understanding the detailed radar interaction of EA
Optional Upgrades

- **RF front-end:** Dynetics offers a standard 1-18 GHz RF downconversion/upconversion unit, a fixed-frequency Ka-band unit, or can design to meet customer requirements.

- **Pulse detection/pulse repetition interval (PRI) tracking:** PhantomRF has an option to detect pulses, encode pulse parameters into pulse descriptor words (PDWs), and deinterleave multiple emitters to detect and track PRIs. This functionality is useful for emitter waveform verification in test and evaluation applications and is a key enabler for advanced EA techniques against agile threats.

- **Additional EA techniques:** In addition to the EA techniques listed in the table above, Dynetics can implement customer-specified EA techniques with firmware modifications.

- **Custom network ICDs:** Dynetics can customize the network interface of the PhantomRF unit to match existing customer facility protocols.

- **Additional RF channel support:** Dynetics can provide RF downconversion/upconversion units and PhantomRF units capable of supporting 3 or more RF channels.

Innovating Sensor Technologies
Since 1974

Dynetics has a rich heritage in radar system analysis, development, and testing. We have decades of experience supporting the U.S. intelligence community in reverse engineering, providing in-depth understanding of foreign weapon system capabilities and developing air and missile defense systems. Dynetics comprehends the detailed interactions between radar systems and EA techniques and uses this expertise to solve challenging problems.

RDM examples of some of the EA techniques available with PhantomRF

- **Cover pulse EA**
- **Random false plot EA**
- **Multiple false targets EA**
- **Spot noise EA**

ELINT pulse viewer allows real-time view of detected pulses.