

# G.R.I.P.S.

## Highlights

- G.R.I.P.S.™ Description
- FlexVMT™ Description

## G.R.I.P.S. Feature Set

- *GeoLocation*
- *Reach - Extended*
- *Interference - Mitigation*
- *Privacy/Security - Increased*

The Phocus Array™ product line, from Fidelity Comtech, Inc., utilizes second generation wireless “Phased Array” technology contained within the patented FlexVMT™ technology. G.R.I.P.S. is an acronym for the feature set and key benefits of the implementation of the technology in any product.

**G.R.I.P.S.** stands for **Geo**Location, **Reach**, **I**nterference mitigation, **P**rivacy and **S**ecurity.

### GEOLOCATION

Fidelity Comtech has implemented and is extending a premium GeoLocation feature set based on the power of the FlexVMT technology. The current set provides three levels of GEO capability with additional refinements coming soon. This document presents high level definitions of the first three levels.

**GEO-I™** is the ability to dynamically shape, steer and extend the electronic beam used in products implementing the FlexVMT technology. The shaping, steering and extension is performed on a packet-by-packet basis using a dictionary of predefined beam patterns (Custom patterns available).

**GEO-II™** adds the ability to derive the *relative Line of Bearing (LoB) from a single Phocus Array System to the location of a wireless client*. It is currently available as a product available to the U.S. Government only. However, commercial versions are planned.

**GEO-III™** is the systematic implementation of multiple GEO-II: devices, using various methods such as extended distance triangulation, vectoring and polynomial calculations of multipath signals to ascertain *the location of a client device with a very high level of precision and confidence using stand off wireless coverage*. It is currently available as a product available to the U.S. Government only. However, commercial versions are planned.

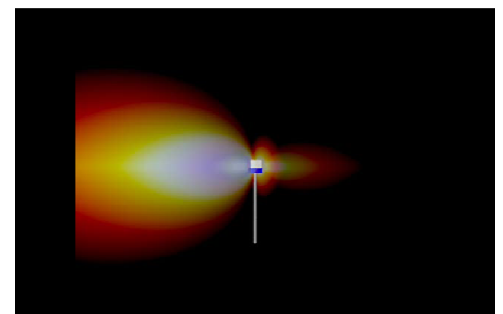
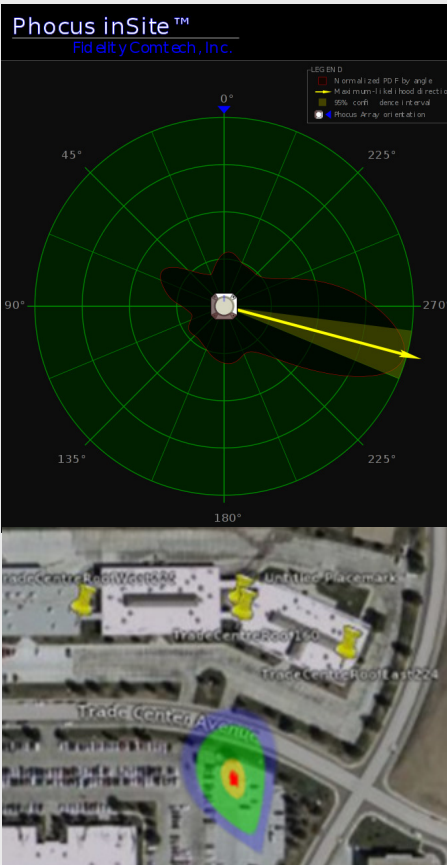
### REACH

The term “Reach” is used to describe how far away a wireless client can effectively receive and transmit 802.11 b/g signals with a wireless infrastructure node.

The limits of Reach have to do with transmitted power, a radio receiver’s sensitivity or rather its ability to distinctly recognize a unique transmission, and the amount of signal interference. It is generally true that system powered Access Points (APs), or system antennas, are capable of much more radiated power and can “extend” or “push” their electronic beam signal much further than battery powered mobile devices.

Thus, the shortest distance an Access Point and a mobile device can actively and reliably communicate is known as its “Reach”.

To increase Reach; transmission, reception, and interference must be improved. To increase transmission distance compared to a simple omnidirectional or diversity antenna, a phased array antenna focuses the signal energy in a desired direction. While omnidirectional signals send the energy in all directions, a phased array antenna uses its multiple antenna elements, transmitters, and receivers to cooperatively “boost” the signal in a desired direction and diminish the signal in others. Similarly, receiver “gain” is accomplished when the phased array’s elements and receivers act together to receive a signal.

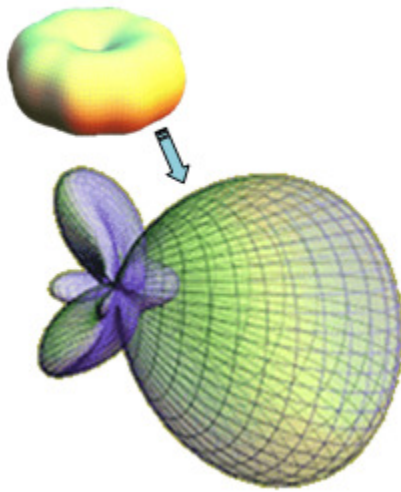


Dynamic phased array antennas, specifically the FlexVMT technology used within products such as the Phocus Array, offer nearly four (4) times the Reach of a common omnidirectional or diversity antenna. **INTERFERENCE MITIGATION**

The key to Reach, both for the Mobile Device and the APs, is the ability of the receivers to discriminate a specific "Tuned" signal at its weakest point in a surrounding full of electronic noise from other radiated signals from the general environment and universal bodies like the sun.

The main reason dynamic antennas have extended Reach over traditional omnidirectional antennas is because shaped steered and extended beams produce much lower noise environments. Signal-to-Noise Ratios (SNR) may be improved by putting the desired signal only in the area of concern and not bleeding over into other environments. Thus, signal clarity or reliability is greatly enhanced.

The beam pattern can also avoid other radiation patterns and sources, avoiding interference while improving signal reach and quality for better throughput performance due to fewer packet retransmissions and approximately four (4) times the Reach for the average Wi-Fi device.



## PRIVACY / SECURITY

The first rule of wireless security is to prevent others access to the transmitted signal. Omnidirectional antennas commonly used in APs radiate in a full 360° pattern that resembles a "donut-like" shape. The dynamic beam can be shaped, steered, and extended to cover only the desired "footprint" and keep the signal from "bleeding" over into unwanted spaces. Thus, the system administrator can "Avoid" other areas providing privacy. Signal Avoidance is step one. The FlexVMT-based dynamic antennas electively directs its signal improving security and privacy dramatically by reducing eavesdropping possibilities and interference. Signal Avoidance also helps minimize the noise "pollution" for other environments maintaining their Reach and permitting a "good neighbor" policy.

## FLEXVMT

Since 2001, Fidelity Comtech, Inc. (FCI) has been the premier provider of RF amplifiers and antennas to commercial and government end customers, system integrators, and original equipment manufacturers (OEMs). Our customers use our products in security, ultra-high mobility, mobile network, mobile asset tracking and management, and data wireless local area network (WLAN) applications. Located at the base of the Rocky Mountains in Longmont, Colorado, Fidelity Comtech designs, manufacturers, and supports products for our customers from amplifiers and antennas to complete system products like the Phocus Array 3000X wireless access point and router.

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Fidelity Comtech's small, patented light-weight flexible Vector Modular Technology™ (FlexVMT), is a circular 8-element focused array beam has a variable target footprint from a standard 360° omni-directional pattern to an extended long-reach focused 43° pattern. The FlexVMT can electronically switch between steered or shaped patterns in less than 100 μSecs on a packet-by-packet basis or be statically administered.

The beam pattern can also avoid other radiation patterns and sources, avoiding interference while improving signal reach and quality for better throughput performance due to fewer packet retransmissions.

The FlexVMT Dynamic Antenna combines signals from all eight antenna elements to form each pattern, even a "super" omni-directional. This "spatial integration" provides up to 6.1 dB better performance than traditional antenna diversity systems.

The Phocus Array System is ideal for "Multipath" environments" In these environments at least some antenna elements in the circular array will be able to capture the signal. Thus signal reach and fidelity is consistently maintained and often enhanced by utilizing the power in the multipath signals.

FlexVMT powered Phocus Array Systems are being used in wireless Internet services, various maritime harbor solutions, intermodal yard tracking, warehouses communications, educational research, strategic and tactical government security, and defense applications.

