

## GAUSSIAN OPTICS LENS ANTENNA



### FEATURES:

- Wide bandwidth
- Highly efficient, low loss
- Low sidelobes and VSWR
- Integral radome/lens
- Polarization options offered

### APPLICATIONS:

- Communication systems
- Radars and remote sensing
- Surveillance/EW/ELINT
- Plasma diagnostics
- Monopulse tracking

### DESCRIPTION

Millitech series GOA Gaussian optics lens antennas form well-defined Gaussian beams through the use of corrugated feedhorns and efficient dielectric lenses. Their radiation patterns are characterized by circular symmetry, high efficiency, and low sidelobes.

In Gaussian optics transmission, the propagating signal is not confined by metal or by dielectric walls, but travels in free space, resulting in a very low loss system. The beam can be separated into its orthogonally - polarized components for dual polarization operation or utilized in the single polarization mode.

GOA antennas are available in waveguide bands from 18 to 220 GHz, with a typical net efficiency of 50%. Sidelobes are 23 typical, and VSWR is 1.5:1 typical.

The series GOA is available in single or dual polarization. The single polarization GOA can support linear or circular polarization. It can also be configured as a dual polarization antenna by attaching a series OMT orthomode transducer to the output circular waveguide of the antenna. Dual linear polarization is achieved by

incorporating a free-standing wire grid polarizer in the antenna. Cross polarization isolation is outstanding at > 30 dB.

A lens antenna with its beam focused at a finite distance (typically a few lens diameter's length in front of the lens) can be configured for applications requiring a spot beam focus. This configuration is offered with either a single antenna or a pair of antennas, depending on customer requirements. This option is particularly useful for near-field applications such as plasma diagnostics, material properties measurement, and certain short-range probes. Focusing Gaussian optics lens antennas are produced as a custom product to meet specific application requirements.

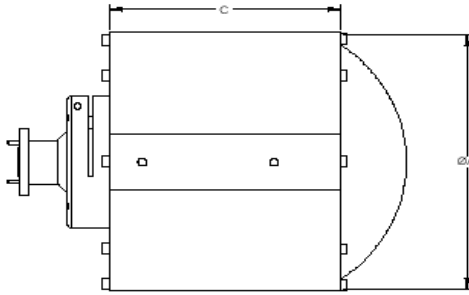
For subsystems such as receivers, transmitters, transceivers, radios, and measurement instruments, Millitech can integrate the remaining subsystem and antenna within the same housing. This results in a reduced package size for the total assembly. Custom diameters, materials, and configurations are available. Please consult our sales department for details.

## MECHANICAL SPECIFICATIONS (EXAMPLES)

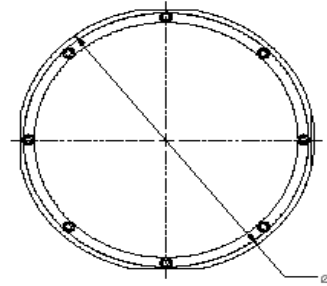
A Lens Diameter (in/mm)	3.00/76.2	6.00/152.4	9.00/228.6	12.00/304.8
B Housing Diameter (in/mm)	3.75/95.3	7.00/177.8	10.80/273.1	12.75/323.9
C Housing Length (in/mm)*	3.25/82.6	6.25/158.8	9.63/244.6	12.00/304.8

\*These lengths are typical and can vary  $\pm 0.5$  in/13 mm depending on the frequency band.

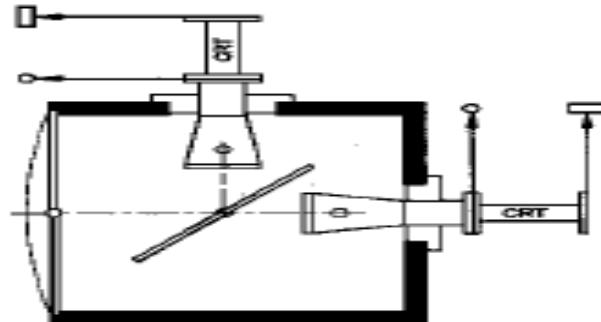
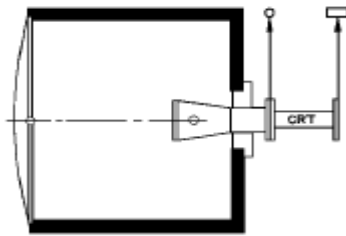
## OUTLINE DRAWINGS\*



Single Polarization



Dual Polarization



\*The outlines shown may not reflect the latest information. Please contact Millitech for current outline drawings.

## ELECTRICAL SPECIFICATIONS

Performance Parameter	Range	Remarks
Frequency range (GHz)	18 to 220*	Practical range for waveguide feeds.
Lens diameter (in/cm)	3/7.62 6/15.24 9/22.86 12/30.48	Other diameters available as custom products.
Beam angles (degrees) (nom)	0.1 to 10	Depending on lens diameter selected and frequency of operation.
Gain (dBi) (nom)	25 to 50	Depending on lens diameter selected and frequency of operation.
Sidelobes (dB) (typ)	23	Depending on lens size and requirements.
VSWR (typ)	1.5:1	Return loss 14 dB typical.
Cross polarization isolation (dB) (dual polarization version)	>30	Scalar feed with polarizer grid provides very high cross polarization isolation.

\* Other ranges available upon request. Please consult Millitech for details.

## CIRCULAR WAVEGUIDE SIZES

Rectangular Waveguide Band	Circular Diameter Size	Frequency Range (GHz)*	Circular Waveguide Diameter (in/mm)	Specify When Ordering
<b>K</b>	Large	17.5-20.5	0.455/11.56	<b>455</b>
	Medium	20.0-24.5	0.396/10.06	<b>396</b>
	Small	24.0-26.5	0.328/8.33	<b>328</b>
<b>Ka</b>	Large	26.5-33.0	0.315/8.00	<b>315</b>
	Medium	33.0-38.5	0.250/6.35	<b>250</b>
	Small	38.5-40.0	0.219/5.56	<b>219</b>
<b>Q</b>	Large	33.0-38.5	0.250/6.35	<b>250</b>
	Medium	38.5-43.0	0.219/5.56	<b>219</b>
	Small	43.0-50.0	0.188/4.78	<b>188</b>
<b>U</b>	Large	40.0-43.0	0.210/5.33	<b>210</b>
	Medium	43.0-50.0	0.188/4.78	<b>188</b>
	Small	50.0-60.0	0.165/4.19	<b>165</b>
<b>V</b>	Large	50.0-58.0	0.165/4.19	<b>165</b>
	Medium	58.0-68.0	0.141/3.58	<b>141</b>
	Small	68.0-75.0	0.125/3.18	<b>125</b>
<b>E</b>	Large	60.0-66.0	0.136/3.45	<b>136</b>
	Medium	66.0-82.0	0.125/3.18	<b>125</b>
	Small	82.0-90.0	0.094/2.39	<b>094</b>
<b>W</b>	Large	75.0-88.0	0.112/2.84	<b>112</b>
	Small	88.0-110.0	0.094/2.39	<b>094</b>
<b>F</b>	Large	90.0-115.0	0.089/2.26	<b>089</b>
	Small	115.0-140.0	0.075/1.91	<b>075</b>
<b>D</b>	Large	110.0-140.0	0.073/1.85	<b>073</b>
	Small	140.0-160.0	0.059/1.50	<b>059</b>
<b>G</b>	Large	140.0-180.0	0.058/1.47	<b>058</b>
	Small	180.0-220.0	0.045/1.14	<b>045</b>

\*If the required frequencies fall within two waveguide diameter sizes, the larger one should be selected.

## HOW TO ORDER

<b>Specify Model Number</b> <b>GOA-XX-ABBBCCD*</b>
<b>XX</b> = Waveguide Band <b>WR</b> – number
<b>A</b> = Flange Type <b>R</b> – round (WR-28 through WR-05 only) <b>S</b> – square (WR-42 and WR-28 only) <b>A</b> – Precision Flange per Millitech IS000131, flat option (WR-08 through WR-05 only)
<b>BBB</b> = Circular Waveguide Diameter* (in) <b>See Waveguide Sizes Table</b> (next page) Specify ØØØ for rectangular waveguide output
<b>CC</b> = Lens Diameter (in/cm) <b>03</b> – 3/7.62 cm <b>06</b> – 6/15.24 cm <b>09</b> – 9/22.86 cm <b>12</b> – 12/30.48 cm
<b>D</b> = Polarization/Special Options <b>S</b> – single polarization <b>D</b> – dual polarization (6 in. lens diameter and above) <b>F</b> – focusing version (specify complete requirements)
<b>*Please specify frequency range when ordering</b>