



# Luneburg Lens

Passive radar enhancement

The Luneburg lens is a passive radar augmentation device used to increase the radar reflectivity of a target without the use of additional energy.

The lens reflector is a sphere in shape, usually composed of concentric dielectric shells. By the proper selection of dielectric constants for each shell, radar energy incident on one of the faces of the lens is focused at a point on the rear surface of the lens. The rear conductive surface reflects radar energy back to the source.

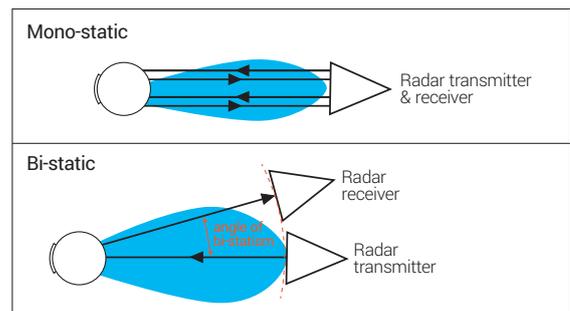
The physical characteristic of a Luneburg lens varies according to its application and the frequency at which it is required to operate. To meet a variety of weapon system requirements, QinetiQ Target Systems integrates a variety of lens types into its targets. Generally these are of 7.5 inches in diameter, but alternative sizes from 4 inches to 8.7 inches in diameter are available.

The radar cross-section of a Luneburg lens is several hundred times that of a metallic sphere of the same size. Requiring no power supply or maintenance, the Luneburg lens is the most efficient, passive radar reflector available.

Lenses are generally of three types, designed to fulfil different technical requirements:

- a) A Mono-static unit, where the radar source and the radar receiver are collocated. This type of lens is a retro-reflector, designed to operate with linear polarised radars. This is the most commonly used general purpose reflector that has a broad band RF capability from S band to Ku Band.
- b) A Mono-static unit similar to that above but designed for use with radars that utilise circular polarisation. These units, which look the same as the linear polarised, work differently and have a much narrower operating band. Therefore they tend to be frequency specific.
- c) A Bi-static unit designed for use where the radar source and receiver are located independently to each other. For example, where a radar is used to illuminate a target so that it can be acquired and identified by a missile's active radar seeker head. This unit is generally used for linear polarised systems.

Other lens types are available to meet specific weapon and user requirements.



The most efficient passive radar reflector available

## Luneburg Lens specifications

### BTT3-0903-000-000

Lens type	Monostatic, linear polarised, retro reflector
Diameter	7.5" (19cm)
Weight	1.7kg
Angle of view	+/- 50 degrees on axis
Typical RCS:	>7m <sup>2</sup> at 10GHz on axis. 5m <sup>2</sup> at +/- 50 degrees 11m <sup>2</sup> at 14GHz on axis. 9m <sup>2</sup> at +/- 50 degrees

### BTT3-0901-000-000

Lens type	Mono-static, circular polarised
Diameter	7.5" (19cm)
Weight	1.7kg
Angle of view	+/- 50 degrees on axis
Typical RCS:	6m <sup>2</sup> at 9.375GHz on axis 1m <sup>2</sup> at 9.375GHz at bi-static angle of 10 degrees

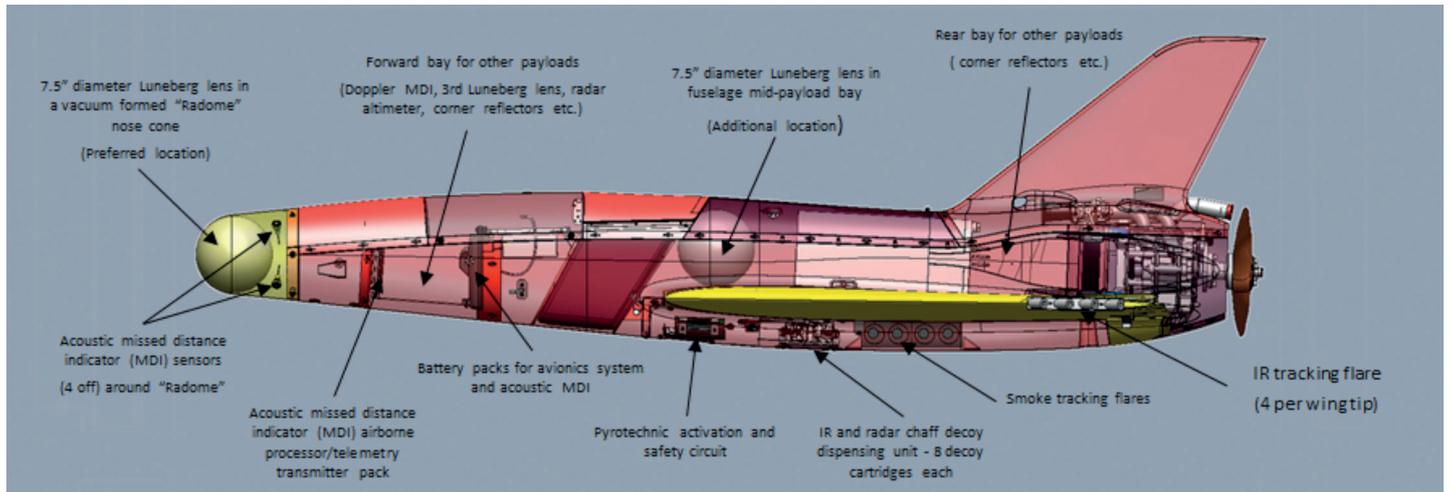
### BTT3-0964-000-000

Lens type	Bi-static, linear polarised
Diameter	8.7" (22cm)
Weight	2.1kg
Angle of view	+/- 50 degrees on axis
Typical RCS:	6m <sup>2</sup> at 9.375GHz on axis 1m <sup>2</sup> at 9.375GHz at bi-static angle of 10 degrees



Proven design with no moving parts ensures reliable operation and no power requirements

Note: Due to continuous process improvement, specifications are subject to change without notice



Infographic of Luneburg lens in a Banshee

## Collaborating with QinetiQ

At QinetiQ we bring organisations and people together to provide innovative solutions to real world problems, creating customer advantage.

Working with our partners and customers, we collaborate widely, working in partnership, listening hard and thinking through what customers need. Building trusted partnerships, we are helping customers anticipate and shape future requirements, adding value and future advantage.

[www.QinetiQ.com](http://www.QinetiQ.com)

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