

Case Study

Development of Metallised Plastic Materials



A 43GHz Horn

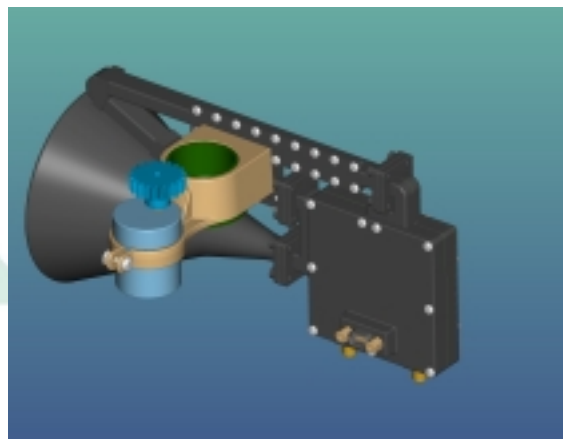
Traditionally microwave waveguide components have relatively high mass and high product cost. Using new techniques and with modern materials, this need not always be the case. The application of high tolerance moulding techniques, high grade engineering plastics and established plating processes, are being researched at Plextek as a solution to these problems.

Metalised plastics have large applications now in mobile handsets to provide functions such as EMC screening and patch antennae, and when a client needed cost effective and lightweight antenna horns for Broadband access, the technology proved appropriate.

With Broadband access that have frequencies in the range of 28GHz to 43GHz, careful choice of base and plating materials is very important, to avoid the potential losses in the system.

The 43GHz experimental horn shown above was part of an early development programme which Plextek carried out to establish the correct plating required to achieve optimum transmission properties at these frequencies.

After establishment of the correct materials and finishes required, the next stage of the development was the 28GHz lens antenna and transceiver unit (see below). This uses a combination of precision investment cast filter design, co-located with metal plated plastics, to create a low cost, efficient and lightweight unit.



A 3D Model of 28GHz Lens Horn

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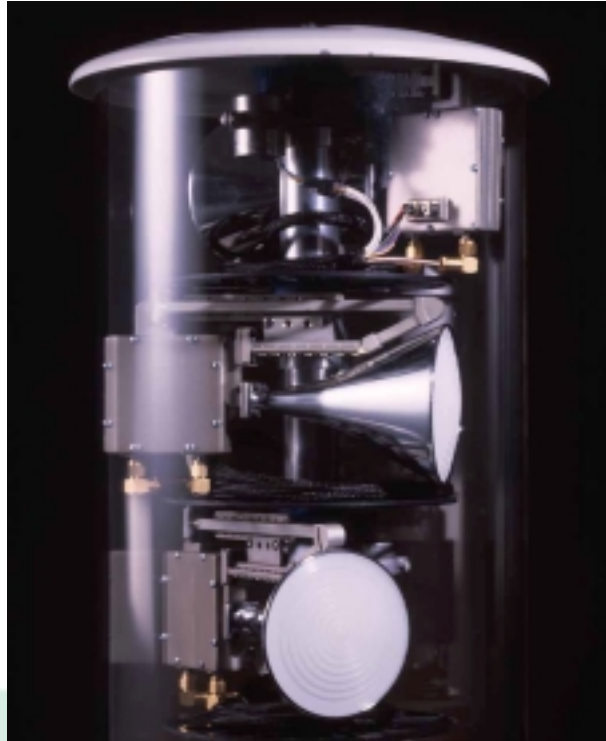
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Each individual part of the total assembly was created using Rapid prototyping methods. These included Stereolithographic Laser Sintering (SLS), rapid waxes (for investment castings) and precision machined parts. Each part was designed with future high volume methods and materials in mind, whilst simulating weight and material as much as possible during the prototype stages. Plextek engineers worked closely alongside raw material and process providers to develop the hardware for this accelerated development programme.

As well as the plated plastic parts required, many of the components in the finished prototype (shown opposite) made use of conductive painted parts both vacuum metallised and spray coated.

Plextek's technical consultants would be pleased to assist on any projects that would benefit from these technologies, potentially adding value and functionality to current products.



Mechanical Model of a 28GHz Lens Horn Assembly



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