

Gapwaves Waveguide Antenna Solutions for Automotive Applications

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Summary

The shift to mmWave frequencies and the need for increasingly reliable sensors has resulted in a growing pressure on automotive radar capabilities, challenging what classical PCB antennas can provide. Gapwaveguide technology has established itself as an attractive solution offering excellent performance and advanced features at an extremely competitive price. We give an overview of the range of automotive radar applications, solutions, and relevant aspects on how this unique technology is enabling large and small players in making cost-effective high-performance radars a reality. An insight is given into the technical as well as the industrialization aspects.

1. Introduction

Waveguides has always been regarded as top-grade RF solutions; however, they have remained limited to nice high-end applications such as military and satellite ones primarily due to their cost and bulkiness. On the other hand, the recent push to higher frequencies of automotive radars and 5G systems has laid bare the limits of the established PCB architecture and has created the demand for new high-performance solutions for mass volume market.

Gapwaves technology [1] has emerged as an attractive solution to bring mm-wave frequencies waveguide performance at commercial lever price. At those frequencies while the bulkiness ceases to be a practical issue, the manufacturing tolerances become critical, especially when assembling multi-layer structures [2]. However, by using a bandgap structure, no galvanic contact is needed between each part and affordable well-established high volume manufacturing processes can be used. Avoiding additional specialized, and unreliable processes is beneficial not only from a cost perspective, but also from a design one, substantially increasing the freedom to choose the best solution from a wide range of options.

After several years of intense and close-customer development, Gapwaves has established itself as a leading supplier for radar antenna solutions [3]. Most importantly, we expanded in a wide range of products and markets within the radar segment, from the simplest and most cost-effective nimble sensors [4] all the way to advanced high-resolution premium ones [5].

We will present an overview of the technical solutions and advantages that Gapwaves waveguide antennas can offer in automotive applications. Depending on the application, we will highlight what we see as the main requirements and solution, such as to offer tailored and unmatched performance, formfactor and cost.

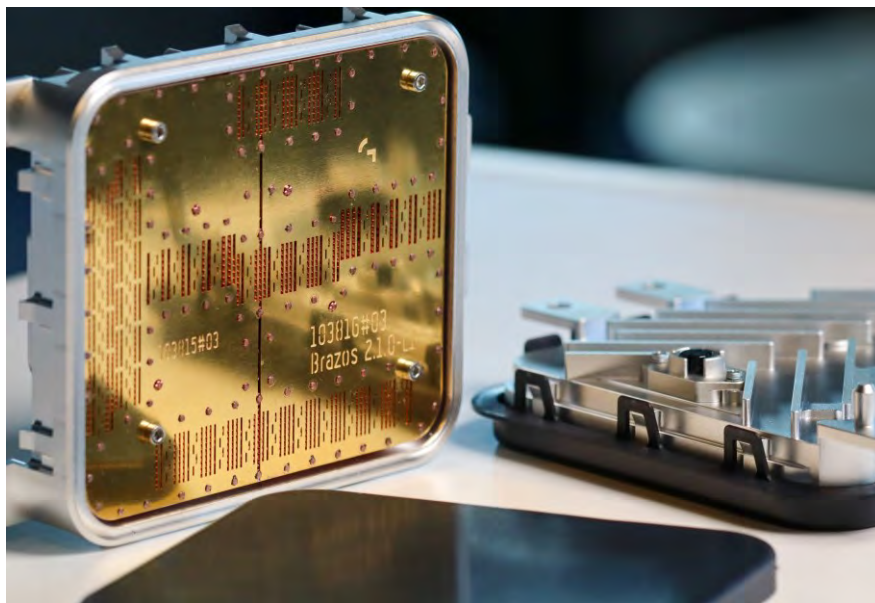


Figure 1. A Gapwaves imaging radar, featuring a large number of channel for improved resolution.

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