

# Small Satellites, use, as its Key, MetaLens Antennas

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**Abstract**—This paper suggests a possible solution to make a relatively light satellite with metamaterial antennas. The key to lowering the weight is changing the bulky waveguide to a compact metal-fenced layered version as an important part of antenna feed assembly. The design shows the unwanted band of the feed horn is suppressed and it is connected to the metasurface that contributes an effective increase to antenna gain of the radiated wave nearly 22 dBi for 28 GHz as a 1 GHz-bandwidth Ka-band signal. This will pave the way to produce small satellites with fewer risks or smart and efficient LEO ones.

*Keywords*—Satellite, LEO, Antenna, Radiated Wave, Smart, Efficient

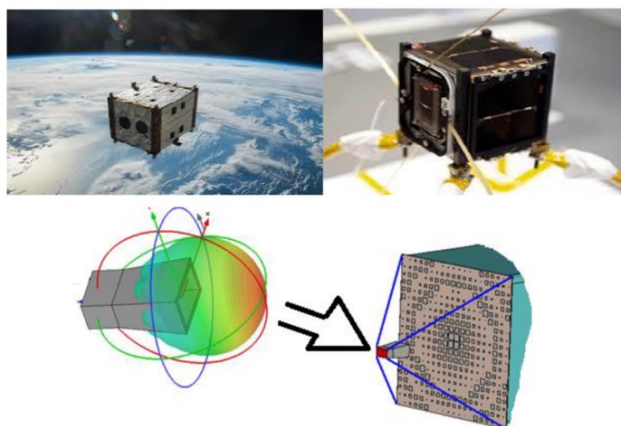


Fig. 1. The proposed antenna system: geometry

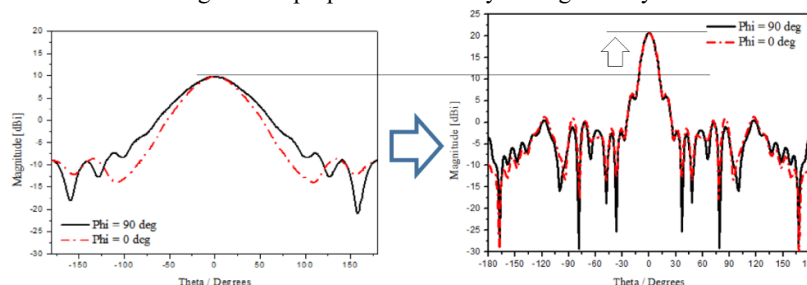


Fig. 2. Substantial increase in antenna gain despite its being a small structure

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