"Printenna": A 3D Printed Biquad Yagi Antenna for Transmission of Space Solar Power

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The objective of this research project was to utilize 3D printing and additive technology to produce a high efficiency antenna that could be readily produced anywhere, including space, for transmission of solar power, and be custom scaled for optimization at a desired frequency. A 3D printer was used to fabricate a 5-element biquad Yagi antenna using polylactic acid filament (PLA) and highly conductive silver epoxy. The 3D printed antenna was tested and compared to a commercially available biquad Yagi antenna constructed with copper clad printed circuit boards and a conventional Yagi antenna. The 3D printed antenna had the greatest directional gain (+9 dBi) of all three types of antennas tested. Thus, 3D printing and additive manufacturing techniques are promising technologies for production of highly effective, complex antennas in space, as well as here on earth.

Awards Won:

Air Force Research Laboratory on behalf of the United States Air Force: First Award of $750 in each Intel ISEF Category

Patent and Trademark Office Society: Second Award of $500