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**Investigation of the Characteristics of Low-Cost and Lightweight Horn Array Antennas with Novel
Monolithic Waveguide Feeding Networks**

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Abstract

3D printed X-Ku band single horn antenna and 2×1 and 2×2 pyramidal horn array antennas with novel lightweight and monolithic waveguide feeding networks (WFNs) are proposed at 10-15 GHz for satellite communications and radar systems to increase the gain. Proposed novel fabrication method consists of two main steps that are to make the skeleton of horn array antenna from acrylonitrile butadiene styrene (ABS) thermoplastic via 3D printer and to perform copper plating over all surface of antenna by using the electroless plating and electroplating processes. The WFN structures with 3λ element spacing designed and realized by using WR75 waveguide T-junction, E-type bend, and UDR 120 flange. Qualitative agreement between

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