Sub-Millimeter And Infrared (IR) Reflect-Array Antenna

Advantages
• This invention is cost-effective, simple and light-weight
• The variable size of the reflect-arrays provides larger capacity (bandwidth) for processing the radiation

Invention
This is an antenna device that integrates sub-millimeter and infrared reflectarray with a reflective surface for processing higher frequency radiations or infrared radiations.

Background
Reflector antennas (RA) which are one of the oldest known antenna devices have been used in receiving telecommunication, and in modern satellite communication systems. RA have the ability to produce high gain, reduce noise radiations and provide enhanced data transmission. RA are designed to focus radiation unto a specific point thereby increasing the radiation efficiency. However, current technologies employing the principles of RA have failed to process signals at high frequencies (e.g., infrared) and shorter wavelength radiations (sub-millimeter). They are however efficient in processing signals at radio frequencies. In addition, these current technologies integrate mechanically bulky components that are costly. Moreover they lack the suitable modeling software for processing shorter wavelength radiations and suffer from increased signal loss.

UCF engineers have developed a low-cost simpler device that can process shorter wavelength radiations. This is achieved by integrating reflect-array antenna structures along side with inter-element spacing arrays that are less than the wavelength (less than 1 millimeter) of the radiation being processed. These reflect-array structures are flat, passive and planar and allow the stacking of filters for reducing the weight and volume of the overall device.

Application
This technology can be used in civilian or military airports and airbases to manage traffic flow, mobility, and safety. It also can be used in surveillance and tracking objects. Moreover, this technology can be used by radio-astronomers to measure radiation emanating or reflected from celestial sources, ground, or sea.

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Selected References