The Reflect Array (RA) antenna is in the category of high gain aperture antennas and is an alternative for Parabolic Reflector (PR) and Phased Array (PA) antennas. Similar to a PA, in RA, array elements are positioned in a planar grid. A feed antenna illuminates the RA elements, the same as PR. Each element of the RA is then acting as a partial reflector that reflects the incident field with a specific phase. This phase is required to form a uniform aperture distribution that generates the antenna far fields radiation.

Although RAs have a lot of advantages, they suffer from disadvantages, too. One of the main disadvantages compared to PR antennas, is a low aperture efficiency. In this presentation we will show techniques to improve RA aperture efficiency.

The design procedure of an RA consists of several computational steps. This method requires the following steps:

- Feed design: This step uses HFSS™ and MATLAB™ programing.
- Geometry design: This step uses MATLAB™ programing.
- Element design: This step uses HFSS™ and MATLAB™ programing.

Once the antenna is designed, its performance should be analyzed. The HFSS™ analysis of RA is selected, here, which is a very time consuming step but is very accurate. Now, it is clear that the design and analysis of RA requires an expensive computational procedure which herein are implemented by MATLAB™ programing and HFSS™. To speed up the procedure, a MATLAB™ programing has been developed and implemented which controls the HFSS™ simulations through Visual Basic scripting.

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