



DVA-1 Concept Description

Introduction to the Optics

DVA-1 Optics, Configuration

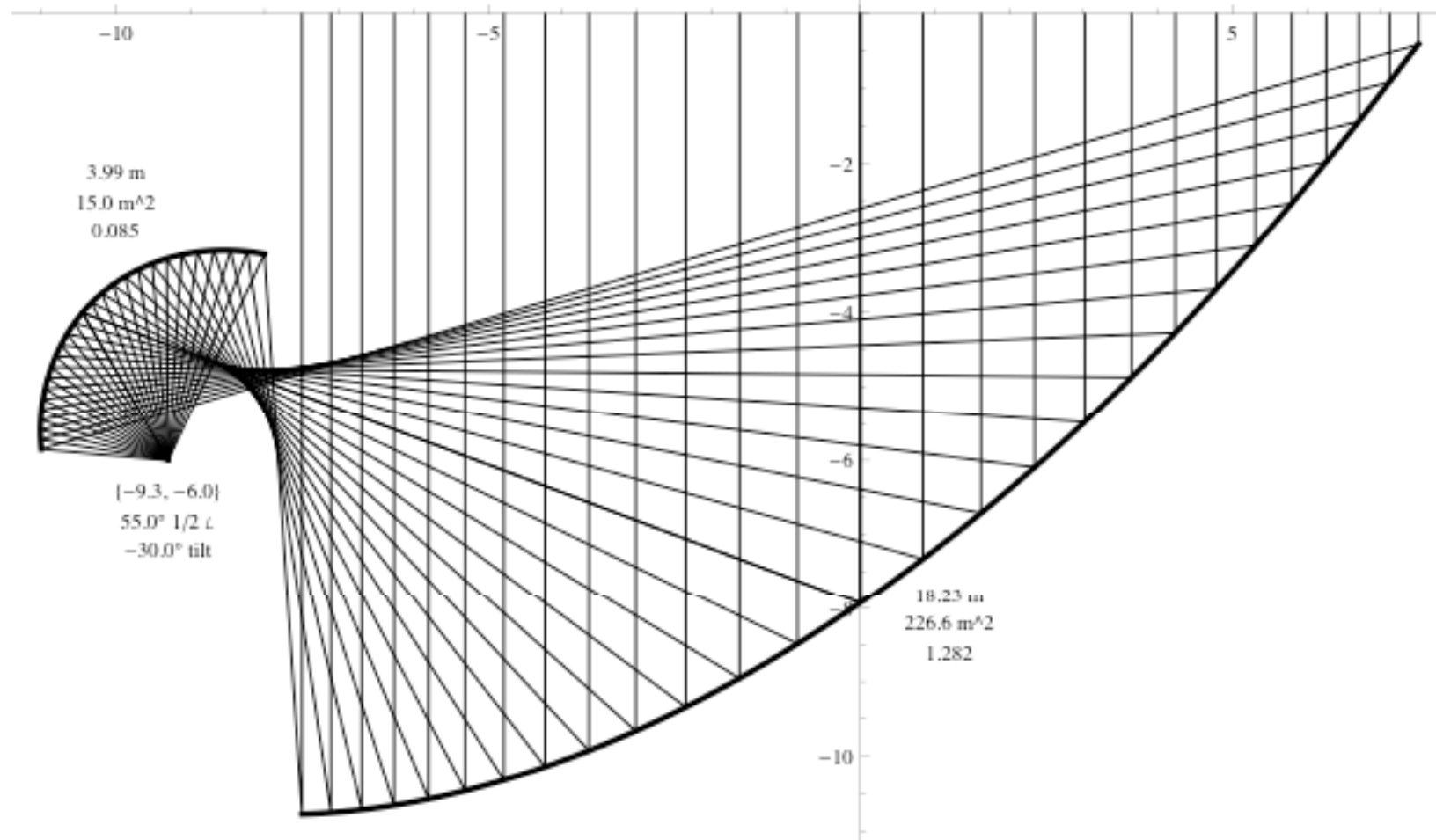


- Offset, Gregorian, Shaped Reflectors
- Wide Opening Angle At Focus
 - Accommodates wide band feeds
- Large Secondary
 - Good low frequency performance
- -16 db. feed edge taper on secondary
- Shaping chosen for -21 db. first sidelobe
- Very Low Spillover, Both Reflectors

DVA-1 Optics, Ray Trace



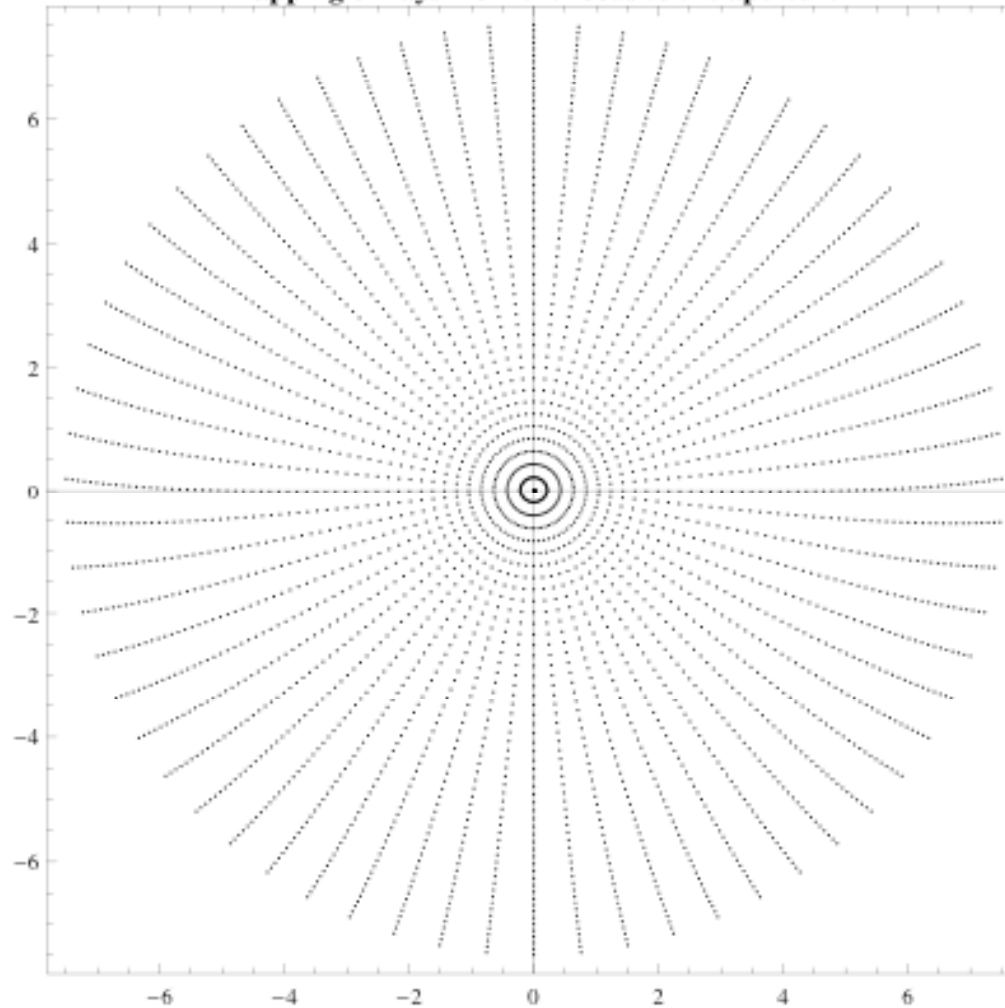
Reflector system cross section in the symmetry plane



DVA-1 Optics, Aperture Mapping



Mapping of rays from the focus to the aperture



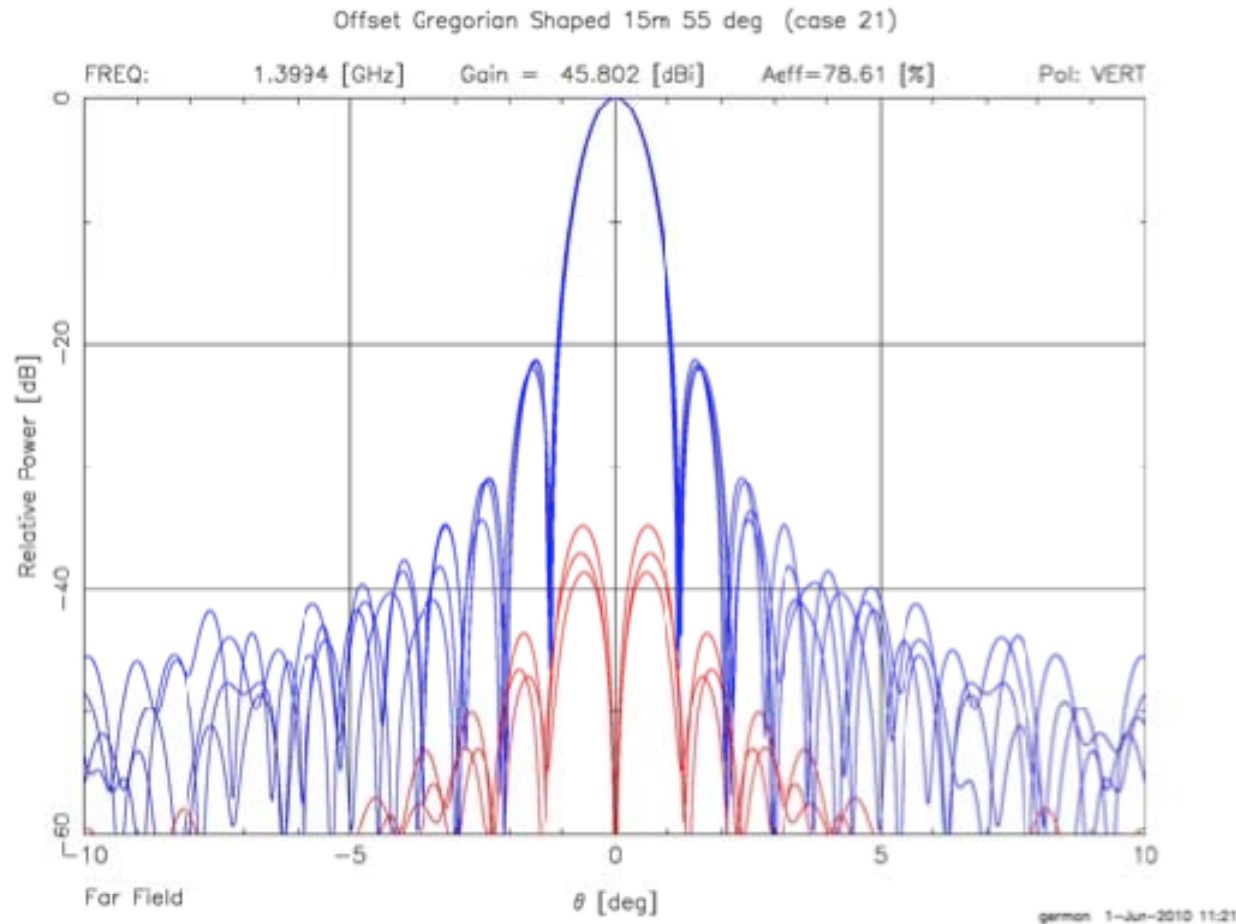
Exploring the Universe with the world's largest radio telescope

DVA-1 Optics, Reflector Shaping

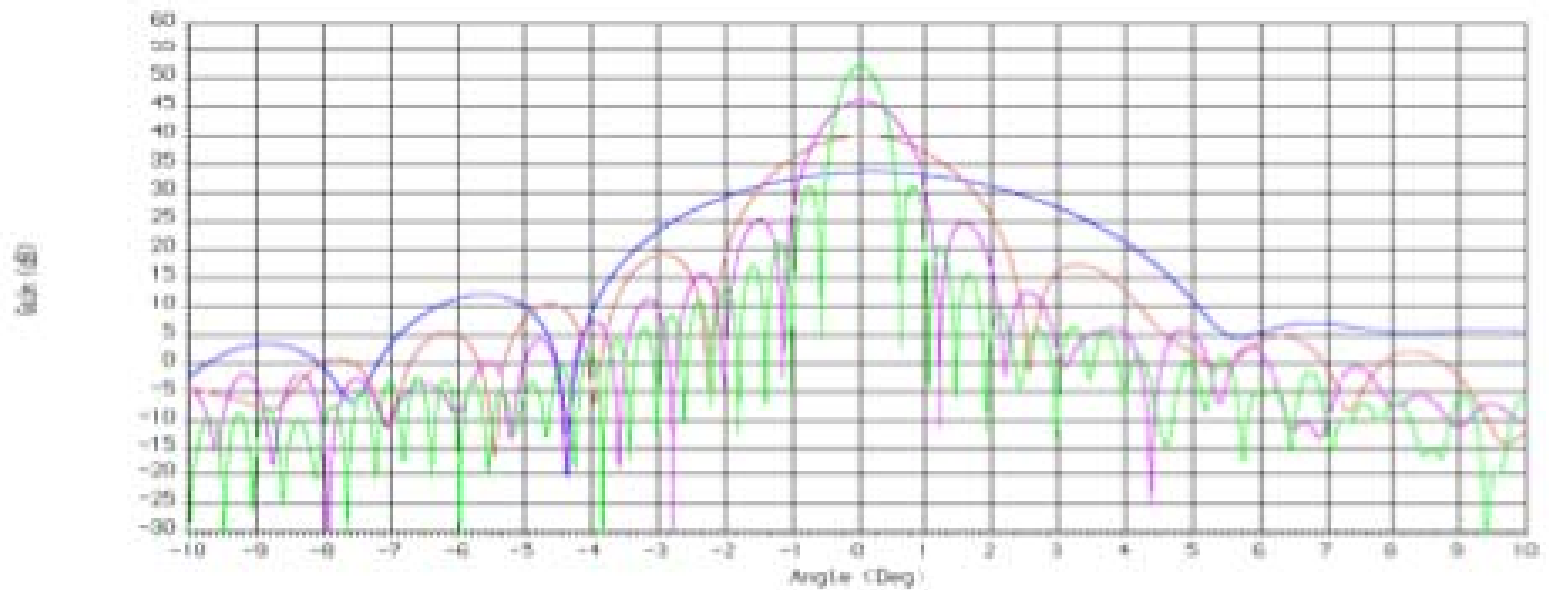


- Shaping selects the aperture distribution
- Feed pattern captured to very low level
- $A_{\text{eff}} / T_{\text{sys}}$ is optimized
- Optics cross polarization is very low

DVA-1 Optics, Beam Pattern

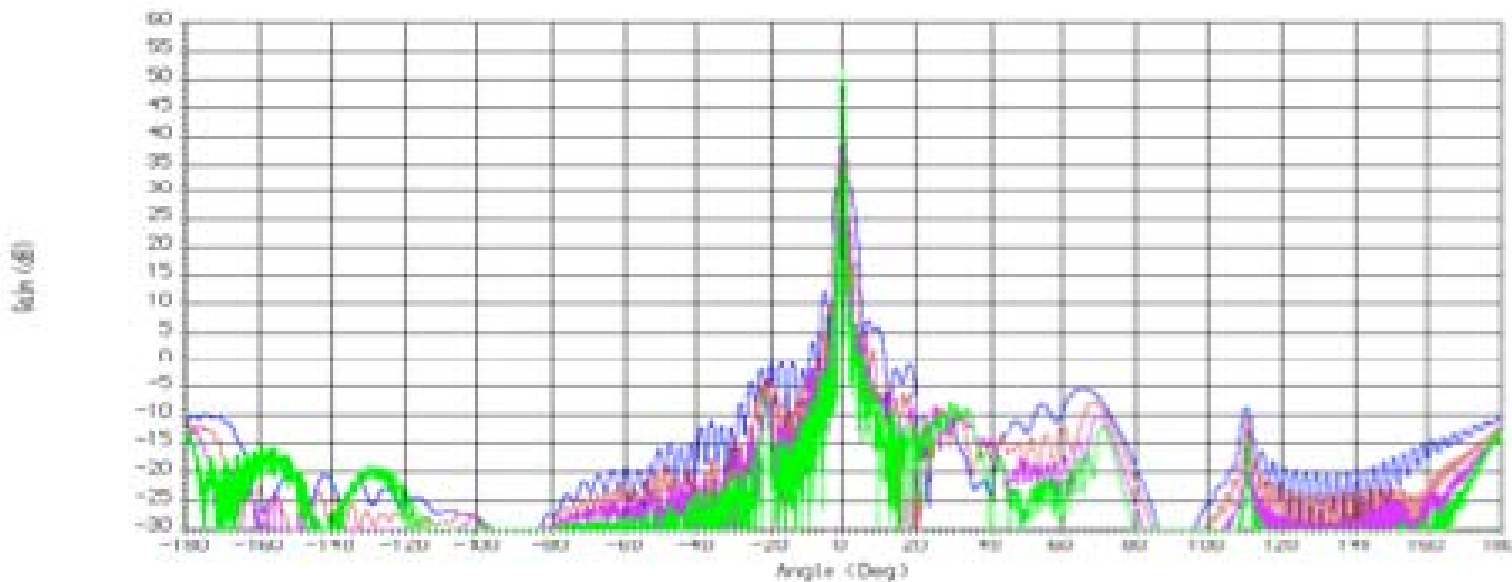


DVA-1 Optics, Beam Patterns



Beam Patterns at .35, .7, 1.4 and 2.8 GHz.

DVA-1 Optics, Beam Patterns



Beam Patterns at .35, .7, 1.4 and 2.8 GHz.

DVA-1 Optics, Low Spillover



- Low edge tapers minimize spillover
- Tant is very low at all elevations
- RFI susceptibility is low in all directions
- Shaping keeps efficiency high

DVA-1 Optics, Summary



- High $A_{\text{eff}} / T_{\text{sys}}$
 - Very low RFI susceptibility
 - Selected first sidelobe magnitude
 - Low cross polarization
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- Actual performance depends on the feed
 - Corrugated horns approach the ideal performance
 - Wide band feeds have lower performance