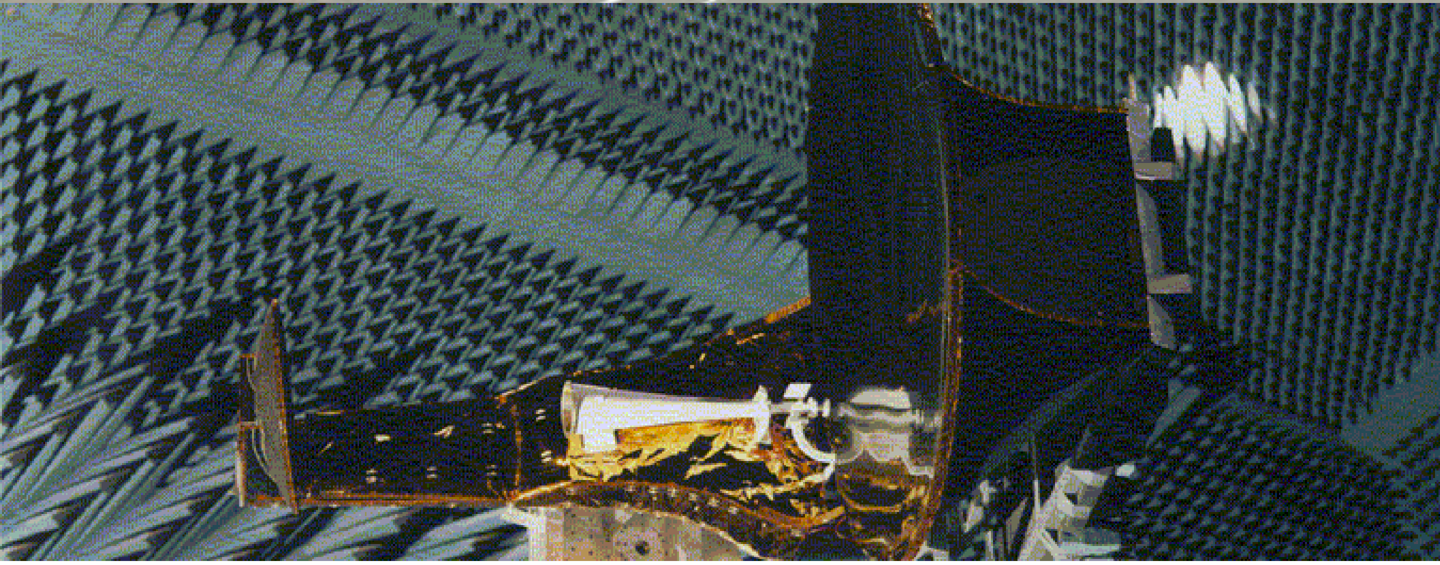
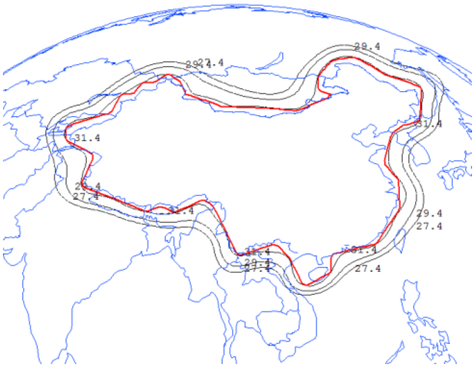


World's most appreciated tool for designing antennas with highly-shaped beams

POS – reflector antenna shaping at it's best
Perfected over decades to meet the most stringent requirements, in close cooperation with the satellite operators, the space agencies and all the major companies in the satellite industry



Gain contours (black curves) for a shaped reflector with optimum performance on China. The satellite is located at the geostationary orbit over Equator, at 100 °East. The red line indicates the area for which the antenna is optimized.

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Application areas:

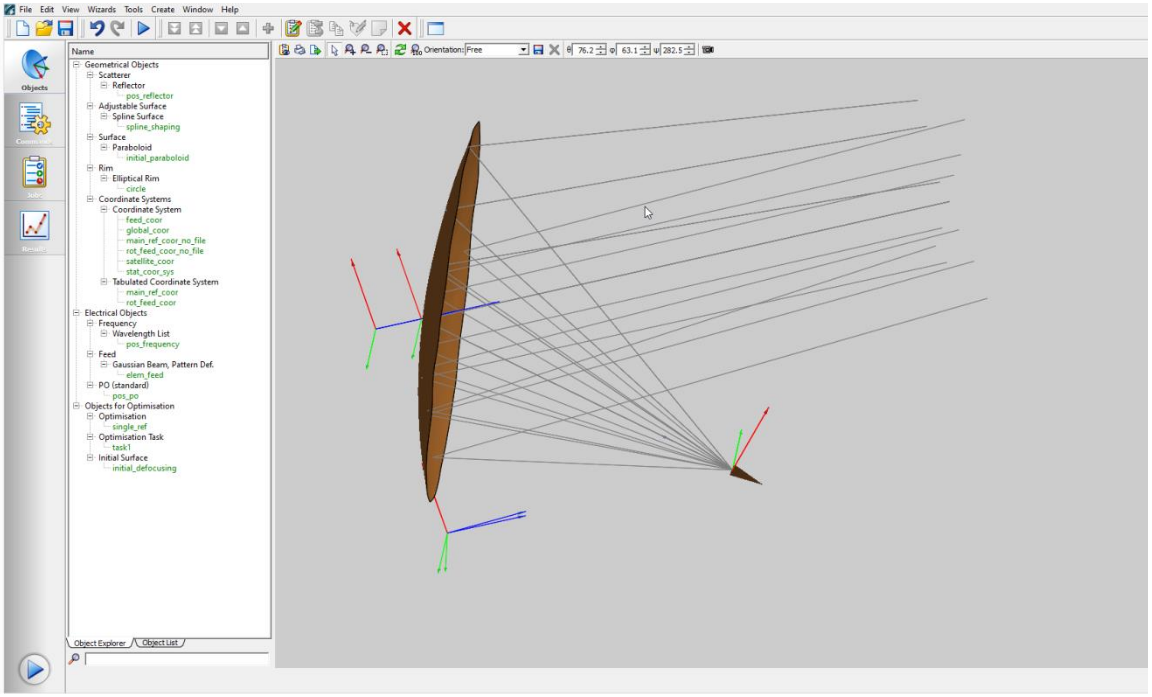
- Shaped reflector for contoured beams:
  The main purpose of POS. The surface(s) shape is part of an optimization process, during which the shape is modified until an optimum performance of the radiation characteristics is achieved

- Array-fed paraboloid
  Optimization of feed array excitation coefficients for given pattern shape

- Pencil-beam antennas:
  Design dual reflectors with general elliptical aperture for high aperture efficiency by shaping subreflector to provide best main-reflector illumination, or single reflectors for enlarged circular beam coverage

- Cosecant-squared beam:
  Design radar antennas providing uniform signal strength for in-coming targets at constant height

- Optimum scanning antennas:
  Shape single offset reflectors to provide unform peak gain for all feeds in a multi-satellite application, by averaging the scan degradations over all feed positions



The POS GUI – easy inspection of the geometry by means of a 3D-view. Specifications to geometry and computations are given throgh the tree structure, and the tabs to the left allows to choose between the design window shown, the command setup window, and the results display. All parameters can be edited while an optimization job is running.

The method:

Starting from a given reflector/feed configuration, the performance of the antenna is sampled over the desired far-field and/or near-field regions. The gain, side-lobe and cross-polar levels can be compared to the prescribed value, and the surface shape and/or feed excitations are modified until convergence towards the goals.

All calculations are performed using the same EM modelling principles as our world renowned reflector ananlysis software GRASP.

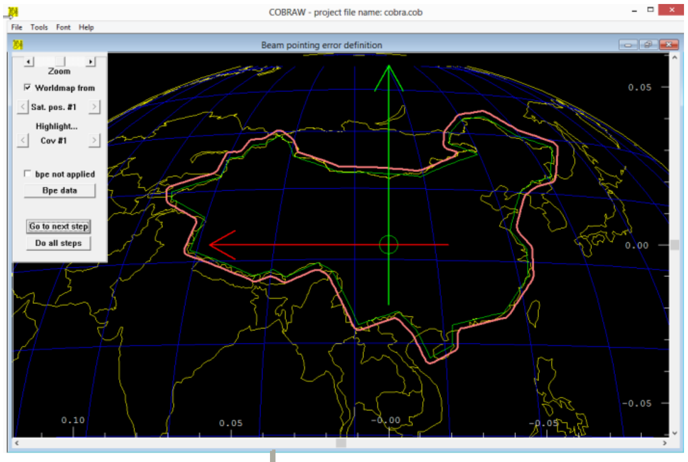
The surfaces are given either by means of spline expansions or Zernike polynomials.

The preferred optimization method is minimax, and a one-sided least square algorithm is also included for special purposes.

Various side-constraints are enforcable, for example limitations on the curvature of the surfaces.

Auxilliary tools:

POS is delivered with a pre-processing tool for setting up coverages by means of clicking on a world map, and for defining initial reflector/array geometries for the optimization.



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