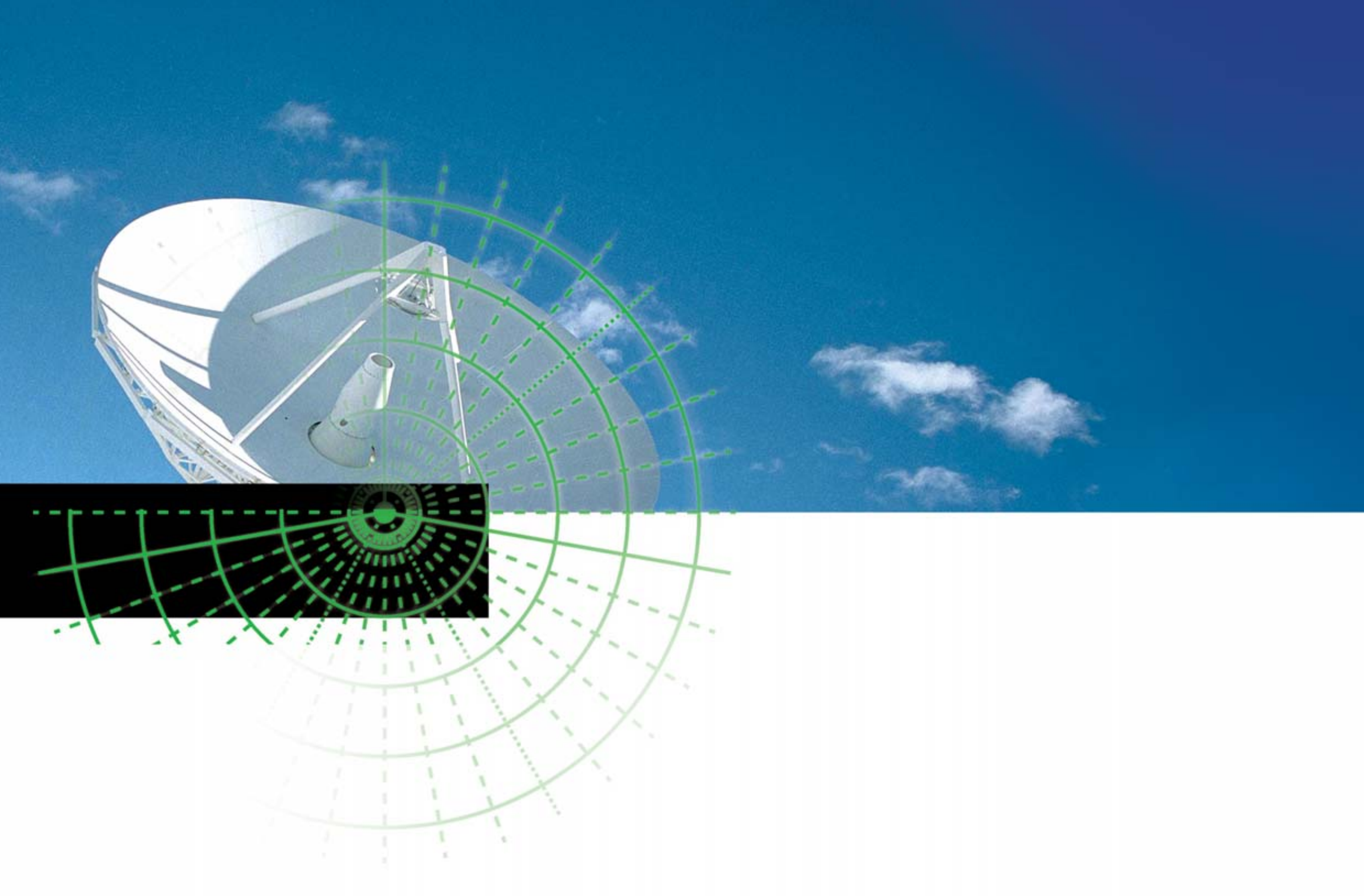


GRASP9

GENERAL REFLECTOR ANTENNA SOFTWARE PACKAGE

Introducing GRASP9

The GRASP9 package is a general set of tools for analysing reflector antennas and antenna farms. It provides a user-friendly interface with user-controllable output options. GRASP9 analyses symmetrical as well as offset configurations with high accuracy.

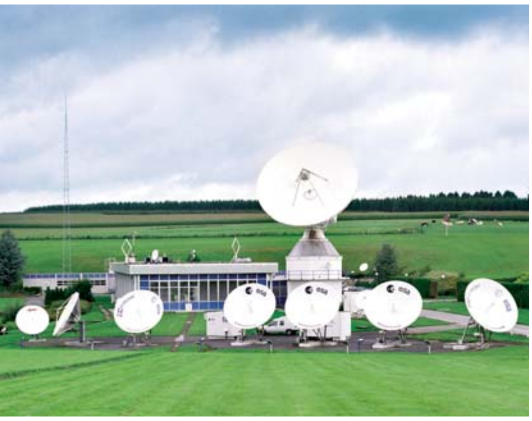
A versatile analysis tool

Building on the heritage of almost 30 years of general reflector antenna analysis software, the GRASP9 package provides an object-oriented approach to modern reflector analysis with graphical pre- and post-processing facilities. This accurate and fast, versatile analysis tool has been developed and refined based on space industry requirements and backed by the European Space Agency (ESA).

It is a general tool, which calculates the electromagnetic radiation from systems consisting of multiple reflectors with several feeds and feed arrays. For many years the space industry has utilized the GRASP9 program due to its high degree of accuracy. GRASP9 makes it possible to analyse the interaction between various antenna systems, which is a requirement on satellites where several antennas may be mounted in the vicinity of each other.

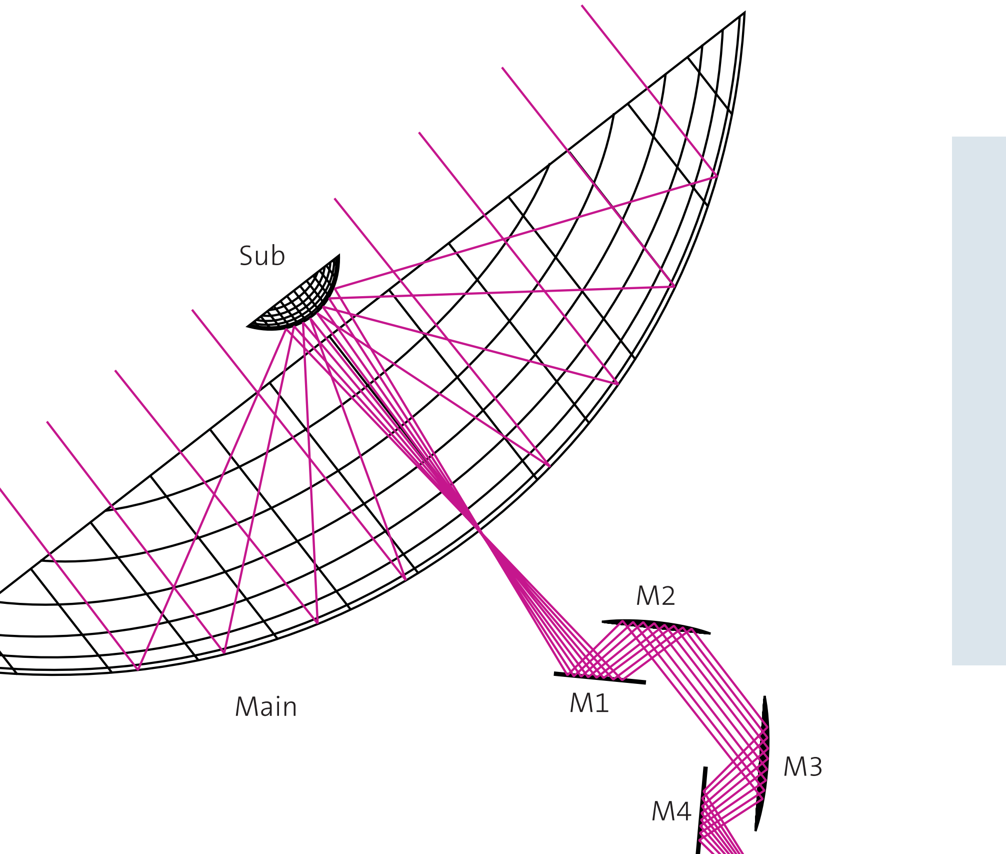
Flexible implementation

GRASP9 can be utilized with different feed systems on many types of complicated, user-defined and random surfaces of different materials.

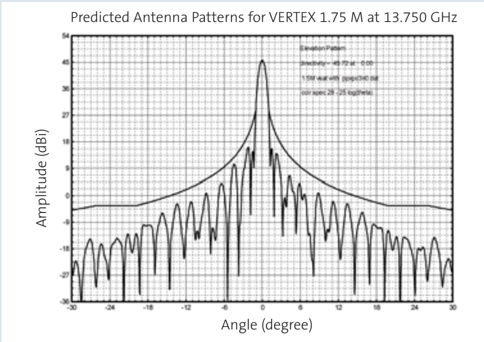


Redu satellite tracking and control station in Belgium

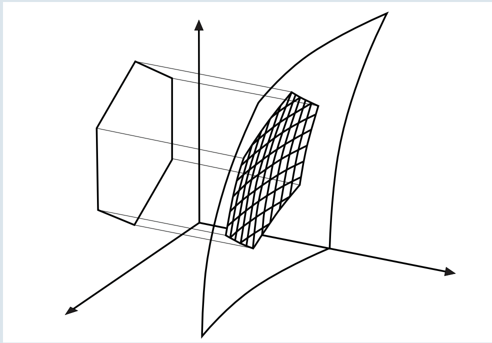
TICRA



Cortesy: VertexRSI

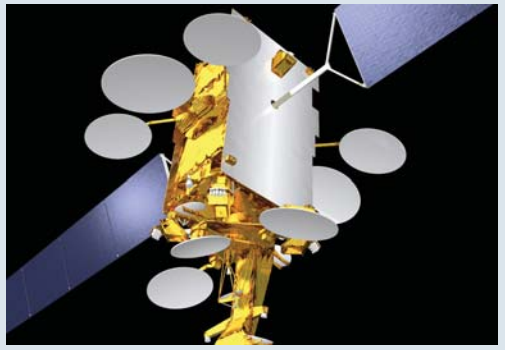


No surprises in the final product - measurements in good agreement with predictions



A flexible definition of the rim allows for many different reflector boundaries

Image© ESA.

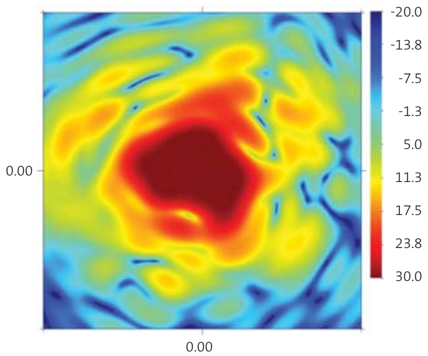


The crowded earth deck of an Alphabus implies the need for scattering analysis between individual antennas

Image© ESA.

Antenna interaction with the solar panels on SMOS can be predicted using GRASP

EISCAT Svalbard Radar antenna. The effect of gaps between the panels can be predicted by GRASP9



Minimum value is -45.61 - Maximum value is 31.77

Highly shaped beam for coverage of Australia from GEO orbit

Reflector surfaces

The reflector shape can be selected among a number of types, including:

- Paraboloid, hyperboloid, and ellipsoid
- General second-order expression in x, y and z
- Numerically defined in a regular x-y-grid
- Numerically defined in an irregular grid – e.g. measured surface points with corresponding values of x, y and z
- Rotationally symmetric reflector with the cross-section defined numerically
- Expansion in Zernike modes
- Expansion in bi-cubic splines
- Random z-values, specified by a correlation distance and an amplitude
- Reflector consisting of polar or arbitrary panels
- Flat plates

Reflector rim definitions

The shape of the reflector rim is defined as the intersection of the surface with a cylinder. In this way the surface shape and the rim shape can be defined independently of each other. The following rim shapes are available:

- Circular or elliptical rim
- Superelliptical rim
- Rectangular rim
- Numerically defined, i.e. corresponding values of x and y
- Triangle or parallelogram (for flat plates)
- Serrated reflector rim

Reflector materials

As high accuracy is required at all times it may be necessary to account for the electrical properties of the reflector materials. GRASP9 provides models for the following surface material types:

- Finite conductivity
- Ideal metal grid, strip grid or wire grid
- Mesh
- Dielectric layer
- Tabulated reflection and transmission coefficients
- Power splitting
- Perfect absorption

Feed types

One of the main program features of the general GRASP9 program is the availability of numerous different feed models. Some of the most important ones are:

- Smooth pyramidal or conical horns
- Simple model for corrugated horn
- Feed represented by a Gaussian beam pattern
- Tabulated feed pattern (measured or predicted)
- Feed described by a spherical wave expansion
- Potter horn
- Microstrip feed

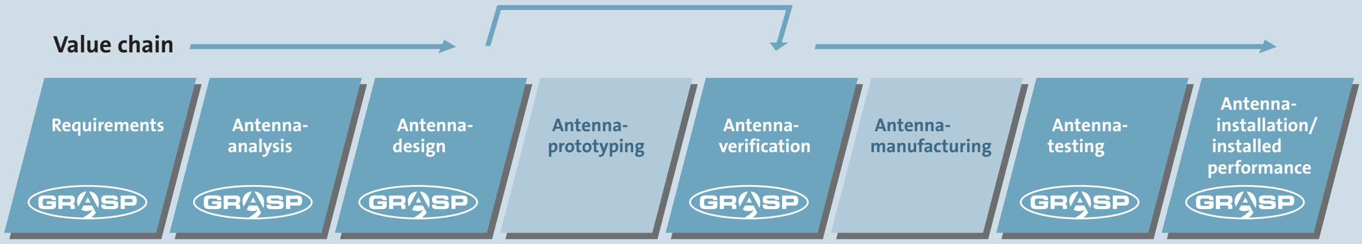
Some models are simple and easy to use, yet they describe the far-field radiation from the source sufficiently well to obtain accurate results far into the design phase of an antenna. For more detailed analysis, the advanced models are available. All models provide exact near-field calculation by way of an internal spherical wave expansion. This unique GRASP9 feature ensures additional accuracy.

Achieving accuracy in your results

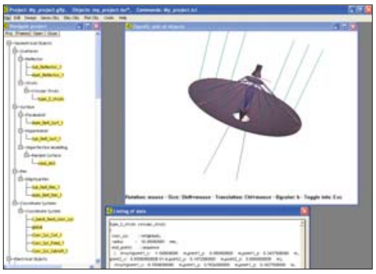
GRASP9 is based on well-established analysis techniques such as Physical Optics (PO) and Geometrical Theory of Diffraction (GTD/UTD). While the ray-based analysis method (GTD/UTD) can only be applied to one single reflector at a time to limit the complexity of the associated ray-tracing problem, PO can be applied to any number of reflector analyses in arbitrary order. This makes GRASP9 extremely flexible because the induced currents obtained by a PO analysis on one reflector can be used as a source on a second reflector.

For accurate analysis on complicated structures TICRA offer a number of add-ons to GRASP9:

- Method of Moments (MoM)
- Multi Geometrical Theory of Diffraction (Multi GTD)
- COUPLING



GRASP9 can be utilized all through your production process, both pre-production and post-production from requirements to antenna installation. GRASP9 is designed to provide high-level accuracy, an accuracy that may enable you to skip the typical prototype process. One of many features that makes your entire production process even more cost-efficient



User-friendly, graphical interface

Not only does the GRASP9 package provide a high level of accuracy, it also allows for great flexibility in visualization when creating complex antenna structures. This is seen in the pre-processor, which can plot the system geometry from any view angle. GRASP9 also makes it possible to generate 3D-data system geometry, in a format that can be used as input to a CAD program.

A sample of GRASP clients:

Aerospace Corporation
Alcatel Alenia Space
Andrew Corporation
Astrium
Astron
Atlantic Microwave
Austin Infosystems
Avtec Systems
Ball Aerospace
BeamTech
Boeing
Brasil Sat
Cardiff University
CASA
Cavendish Astrophysics Laboratory
CNES
Canadian Space Agency
Deutche Zentrum für Luft- und Raumfahrt
ESOC
ESTEC
EUTELSAT
General Dynamics
Goddard Space Flight Center
Hanscom Air Force Base
Harris
Hughes Networks System
INDRA (Spain)
Instituto Nacional de Pesquisas Espaciais
INTELSAT
Jaxa
Jet Propulsion Laboratory
Kathrein-Werke
L3-Communications
MIT Lincoln Labs
Lockheed Martin
Mitsubishi Electric Corporation
MI Technologies
MIRAD
Mission Research
Mitre Corporation
Nat. Astron. Obs. Japan
Nat. Research Council, Canada
Naval Surface Warfare Center
NEC Yokohama
New Skies
NHK
Northrop Grumman
Naval Research Laboratory
NT-Space
NTT DoCoMo
NUIM
Oerlikon-Contraves
Orbital
Oxford Univ.
Patriot Antenna Systems
Radio Frequency Systems France
Rafael
Raven Manufacturing
Raytheon
Rohde & Schwarz
Rymsa
Saab-Ericsson Space
SAC
Space Engineering
SS/Loral
Swe-Dish
TILab
Toshiba Denpa Products
Univ. Of Bern
ViaSat

Press esc to exit

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