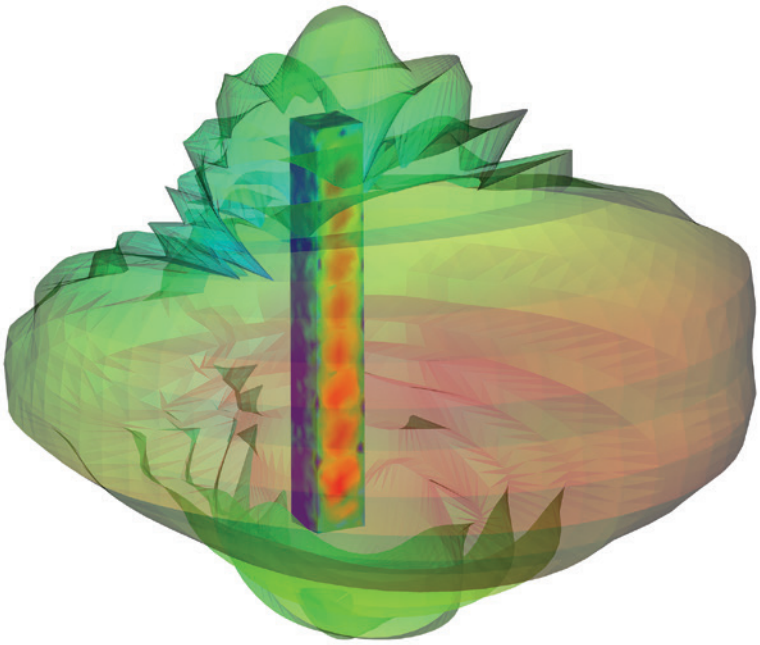
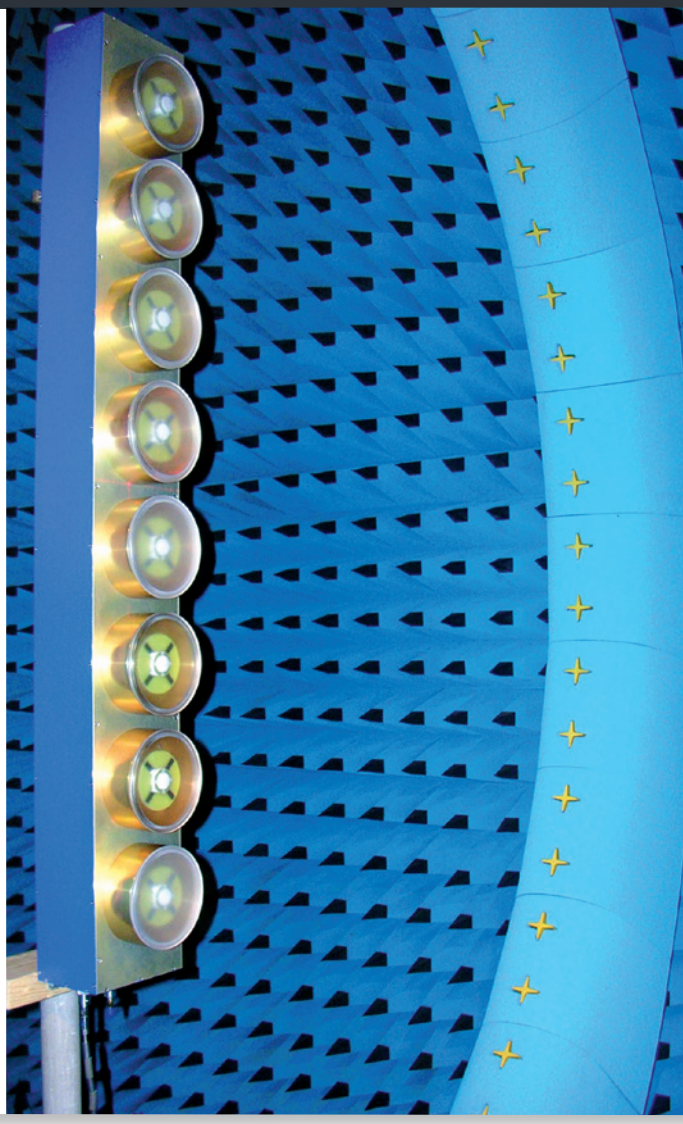
Boost your vision with Insight

NEW RELEASE





- 3D equivalent electric and magnetic current distribution reconstruction
- Innovative algorithm approach
- Cutting-edge 3D viewer
- Multi frequency formulation based on interpolation techniques for fast computations

Thanks to an innovative formulation of the inverse electromagnetic problem, INSIGHT is the first software able to compute authentic electromagnetic current distributions and extreme near fields on your antenna under test from measured near-field or far-field data. Multi frequency formulation based on interpolation techniques and upgrade of fast method have been integrated for fast computations. A newly link between measurements and simulations is available by INSIGHT. This allows, starting from the antenna measurement, to create an equivalent model in the form of a near-field Huygens' box. The equivalent model can be used as a measured source, even with antenna gain normalization included, in numerical simulations of the most complex scenarios.

mvg
Microwave Vision Group

Key Features

INSIGHT owns a set of unique features opening the way to numerous capabilities of analysis and diagnosis.

General
- Native Graphical User Interface based on Windows XP, Windows Vista, Windows 7, Windows 10
- High accuracy results proven by extensive validation campaigns
- Multi frequency formulation based on interpolation techniques for fast computations
- Fast method investigating even large antennas
- Applicability to any antenna measured data, such as Near Field (NF) data (Spherical, Planar, Cylindrical) and Far Field (FF) data
- Link for importing the computed EM antenna models (NF sources or Huygens' boxes) to the CEM software CST Microwave Studio, Ansys HFSS, Ansys Savant, FEKO, ADF, WIPL-D
- Export of gain calibrated measured NF sources for gain normalized radiation patterns in CEM tools

Measurement import
- Import of measurements from MVG measurement systems
- Import of measurement in EDX format
- Import of measurement in GRASP format
- Possibility to request a custom link for importing custom format data

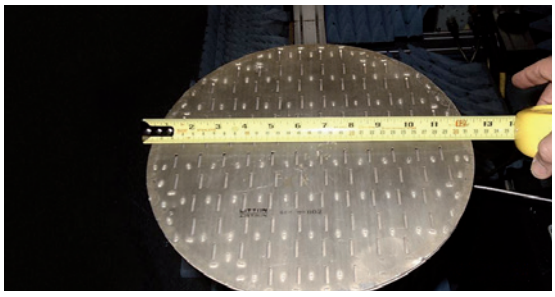
Reconstruction geometry modelling
- Integrated 3D CAD designer
- Import/Export 3D CAD models in file formats such as STEP, IGES, STL and others
- Meshing capabilities of the reconstruction geometry

Visualization and results computation
- 3D view of the current on the surface of the antenna
- 3D view of the fields anywhere around the object under test
- Dynamic 3D cuts, 1D and 2D field visualization
- Animated current visualization
- Animated radiated field visualization

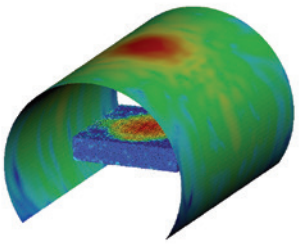
Results computation
- Evaluation of the field in any point outside the reconstruction surface
- Prediction of the computational time and of the allocated RAM before calculation of the equivalent currents
- Filter unwanted currents on a selected area
- Reconstruct the field from the filtered currents to "clean" the measurement
- Far Field calculation from the equivalent currents
- Export of the Far Field to CEM software CST Microwave Studio, Ansys HFSS, Ansys Savant, FEKO and ADF
- Export equivalent currents in form of NF Huygens model to the CEM software CST Microwave Studio, Ansys HFSS, Ansys Savant, FEKO and ADF

NEW

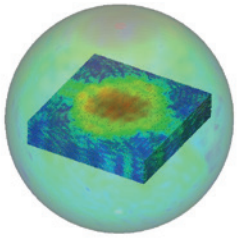
Applicable to different measurement range configurations
- Spherical
- Cylindrical
- Planar near-field



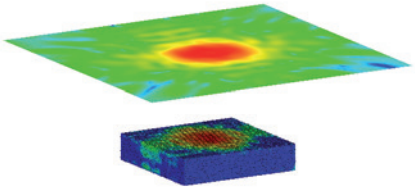
Passive slotted array operating in X band.



Passive slotted array–cylindrical range. The reconstructed J equivalent currents and radiated total near-field are overlayed.



Passive slotted array–spherical range. The reconstructed J equivalent currents and radiated total near-field are overlayed.



Passive slotted array–planar range. The reconstructed J equivalent currents and radiated total near-field are overlayed.

In the antenna design or EMC testing process, the measured radiation pattern or shielding performance does not always correspond to what is expected. Identifying the source of the discrepancies can be a time-consuming process. With INSIGHT, you can reconstruct the equivalent currents and extreme near-field on the antenna: it allows for quick and clear identification of the cause of problems observed during measurement. Further post-processing tools are available for in-depth investigation. Clearly understanding radiation characteristics eases development and shortens time to market.

Key Benefits

❶ Speed up antenna development
❷ Diagnose antenna radiation pattern
❸ Calculate safety perimeters
❹ Investigate the measurement setup
❺ Filter the measurement
❻ Detect spurious radiation
❼ Extrapolate truncation areas
❽ Export the source for numerical computation: The EQC is a highly accurate source for numerical computations of the antenna in a larger EM problem

Numerical method*

The technique is based on an **innovative approach** involving the equivalence principle, a rigorous formulation of the electromagnetic scattering problem and the Method of Moments (MoM).
It computes equivalent sources on a closed surface surrounding the device under test to reproduce the actual fields outside it.

Our recently introduced **augmented formulation** also provides direct diagnostic information such as estimation/localization of source defects (amplitude, phase, polarization) and other sources of unwanted radiation.

The recent integration of the fast multipole method allows the user to process antennas with larger dimensions without sacrificing accuracy while maintaining the orginal formulation.

(*) See the list of publications on the back cover

❶ Speed up your antenna development

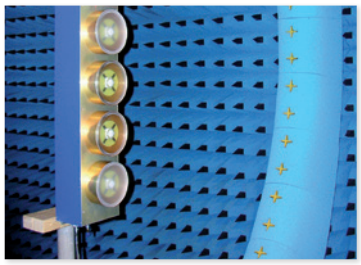
- Provide in-depth understanding of antenna radiation characteristics

❷ Diagnose your antenna radiation pattern

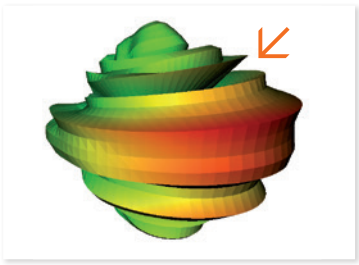
- Determine the location of discrepancies between the actual field sources and the predicted performance
  - Find array element failure, excitation errors, loose connections…
  - View sources of asymmetry / unwanted coupling / de-polarization
- Discover antenna electrical and/or mechanical errors including surface shape and material properties

BTS1940 LINEAR ARRAY ANTENNA WHERE ONE ELEMENT HAS BEEN SWITCHED OFF

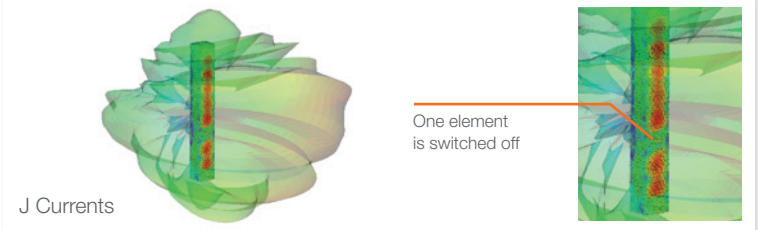
❶ Antenna Measurement Setup



❷ Measured patterns: a problem has been detected

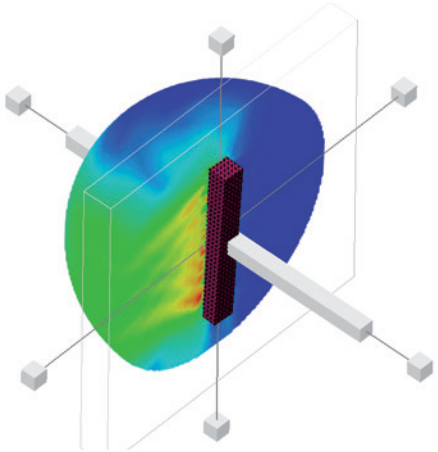


❸ INSIGHT is used to reconstruct currents and fields. The problem is diagnosed.



❸ Calculate safety perimeters

- Evaluate power densities very close to the radiating antenna surface with near-field to near-field transformation



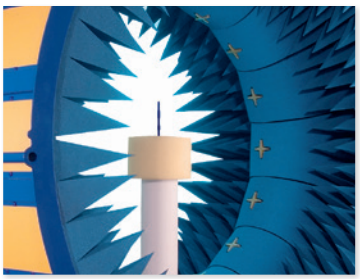
Power densities around the BTS1940 linear array antenna

❹ Investigate your measurement setup

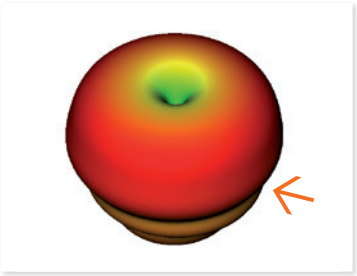
- Discover interactions between the antenna and its surroundings (positioner, mounting structure, fixture …)
- Detect antenna feeding leakage in measurement systems

SD1800 SLEEVE DIPOLE – UNWANTED CURRENTS ON THE FEEDING CABLE IN THE MEASUREMENT SETUP

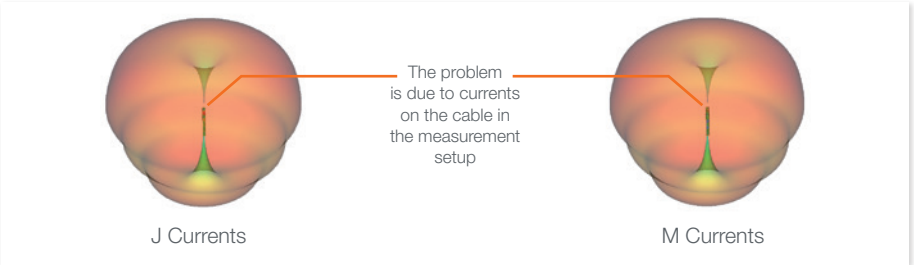
❶ Antenna Measurement Setup



❷ Measured patterns: a problem has been detected



❸ INSIGHT is used to reconstruct currents and fields. The problem is diagnosed.



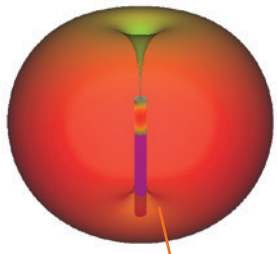
❺ Filter your measurement

- Artificially remove unwanted currents from the measurement (currents from cables, fixtures...) and check for improvement in the antenna radiation pattern

SD1800 SLEEVE DIPOLE – UNWANTED CURRENTS ON THE FEEDING CABLE IN THE MEASUREMENT SETUP

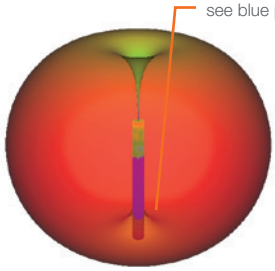
❶ A problem of unwanted currents on the cable in the measurement setup has been diagnosed with INSIGHT (see example of key benefits ④). Unwanted currents on the cable are filtered with INSIGHT.

❷ The near-field of the measurement is processed by INSIGHT. The result is clean. The problem was indeed due to the currents on the cable.

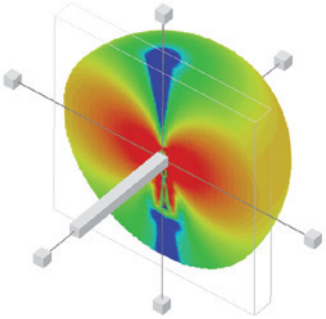


J Currents

Currents are switched-off, see blue part

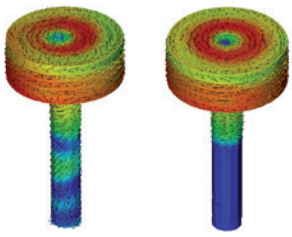


M Currents

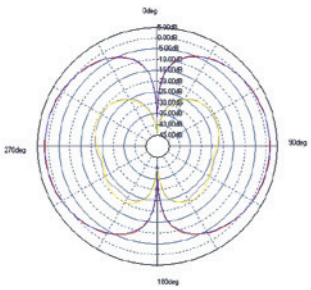


D1800 @1800 MHz

Magnetic dipole



Currents are reconstructed with INSIGHT – Broken cable is diagnosed (left). Unwanted contributions are filtered (right).



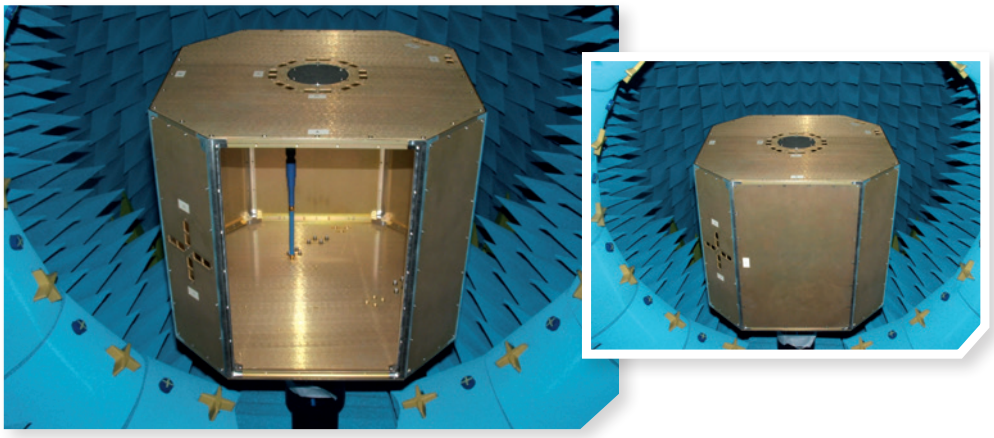
After filtering, the pattern is “clean.”

6 Detect spurious radiation

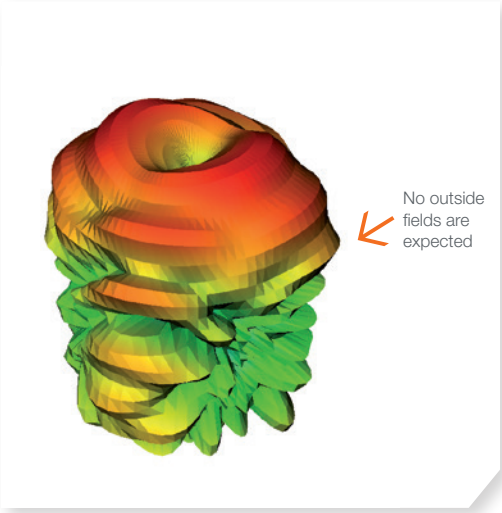
- Troubleshoot EMC shielding, EMS investigation - Pinpoint sources (bright spots) on the shielding structure allowing for the identification of unwanted radiation sources

DIPOLE MEASURED IN A SHIELDED CLOSED BOX

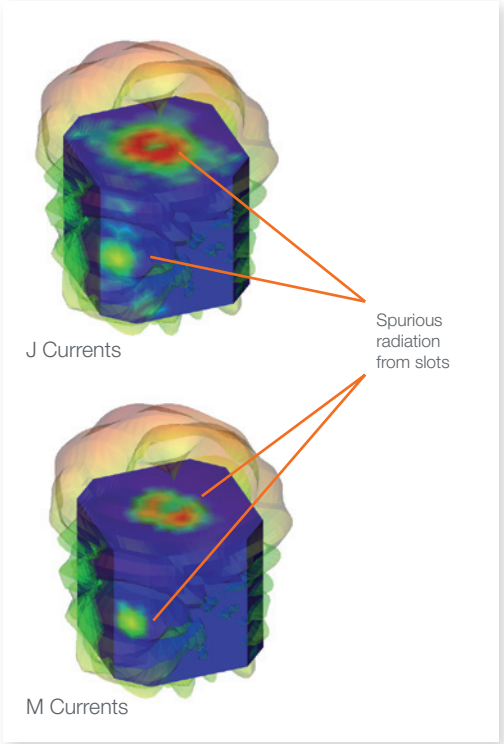
❶ Measurement setup



❷ Measured pattern: a problem has been detected



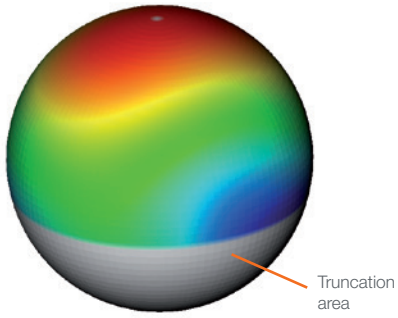
❸ INSIGHT is used to reconstruct currents and fields. The problem is diagnosed.



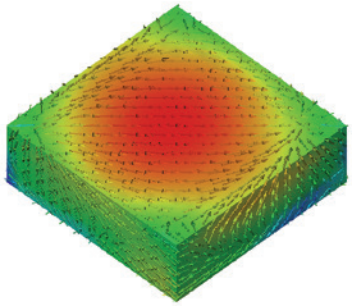
7 Data Interpolation / Extrapolation

- Sparse and missing acquisition data can be compensated with the EQC approach

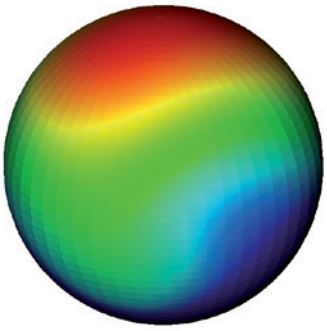
RECONSTRUCTION OF THE FIELD ON THE TRUNCATION AREA IN SPHERICAL MEASUREMENT



The antenna near-field pattern shows truncated area.



INSIGHT is used to reconstruct equivalent currents on the antenna.

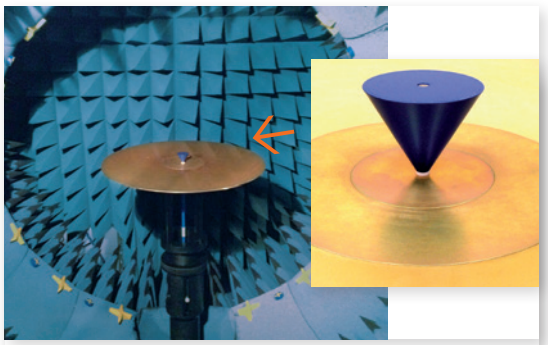


With INSIGHT, the currents are used to reconstruct and show the complete antenna pattern.

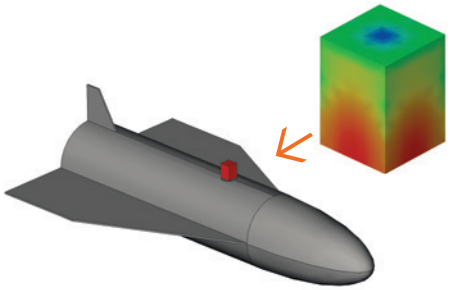
8 Source for Numerical Computation

- The EQC is a highly accurate source for numerical computations of the antenna in a larger EM problem.

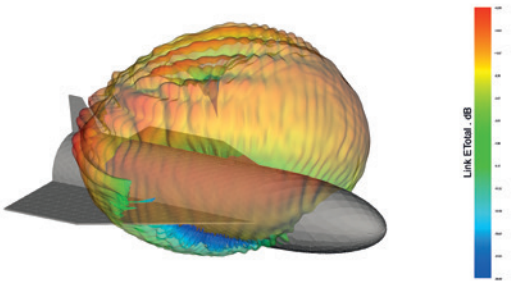
USING EQUIVALENT CURRENTS AS SOURCE IN SIMULATION SOFTWARE



Generic measured source antenna is measured on a minimum of representative ground plane in the StarLab range.

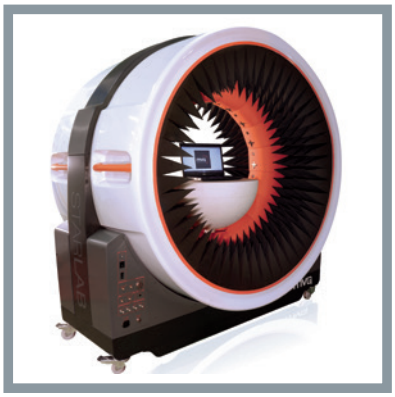


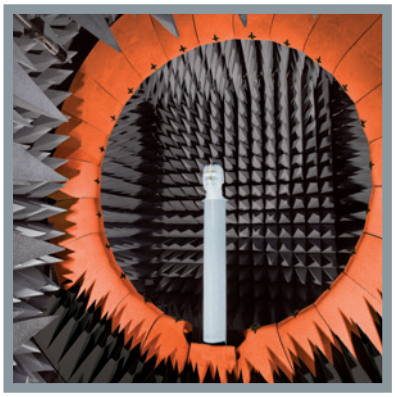
Accurate NF representation of the source antenna is prepared by INSIGHT and used in the Computational ElectroMagnetic (CEM) tools.



The CEM software computes the electromagnetic field.

LINK BETWEEN INSIGHT AND NUMERICAL CEM TOOLS





Insight

SatSim

CST

SAVANT IGPU

FEKO Comprehensive Electromagnetic Solutions

ANSYS HFSS

ADF

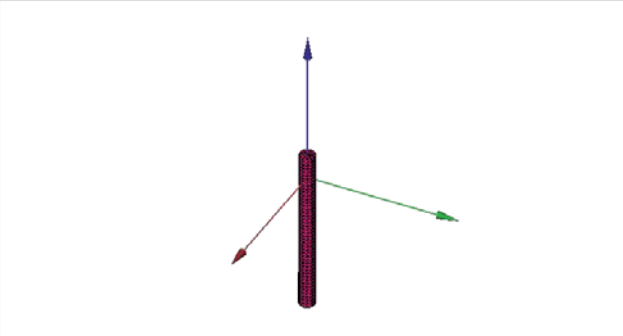
WIPL-D

INSIGHT step by step

❶ COMPUTATION OF THE EQUIVALENT CURRENTS, FILTERING AND NEAR-FIELD COMPUTATION.

Step 1: Load measurement data and import/create the geometry:

- Load the measurement data: near-field (NF), far-field (FF) or both
- Manage the geometry for the current/field reconstruction:
  - Import CAD or mesh files
  - Draw a generic geometry using the CAD functionalities

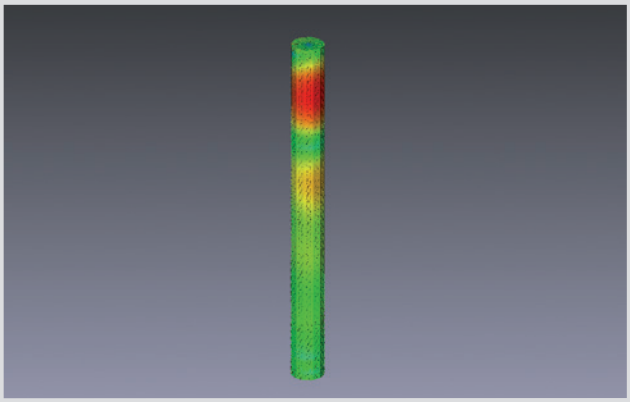


- Create a geometrical surface (box, cylinder, sphere, ellipsoid). A set of predefined geometries is available

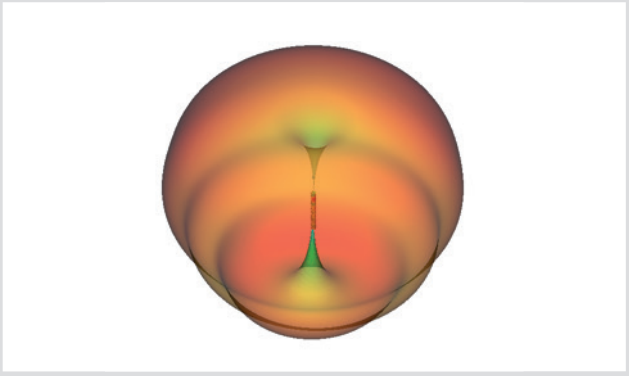
Step 2: Perform the measurement post-processing and visualize the results:

- Configure the measurement data and the geometry
- Perform the INSIGHT measurement post-processing

With the visualization functionalities, one has access to:
- 3D visualization and animation of the currents



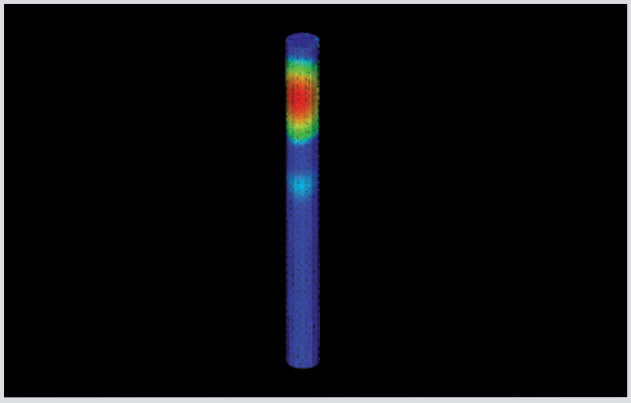
- Visualization of the measured field and the fields reconstructed from equivalent currents



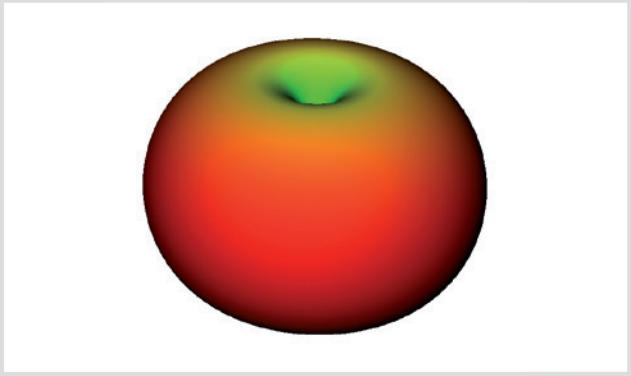
- Electrical (J) and magnetic (M) currents can be simultaneously visualized due to the multi-window ability of the visualization functionalities

Step 3: **Investigate the problem in-depth by post-processing the INSIGHT results:**

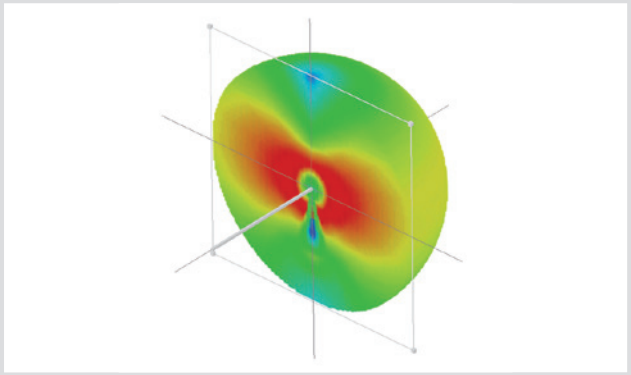
- Filter unwanted currents after the diagnostics
  - "Switch off" the electrical and magnetic reconstructed currents on a selected area of the reconstruction geometry.



  - Compute the radiated field from the filtered current
  - Compare the reconstructed field and currents before and after the filtering



- Perform a near-field computation over arbitrary, user-defined observation points
  - Compute the field on a predefined set of points; a predefined set of points enclosed in a box, cylinder or sphere; or discrete points.
  - Visualize the field in the visualization functionalities



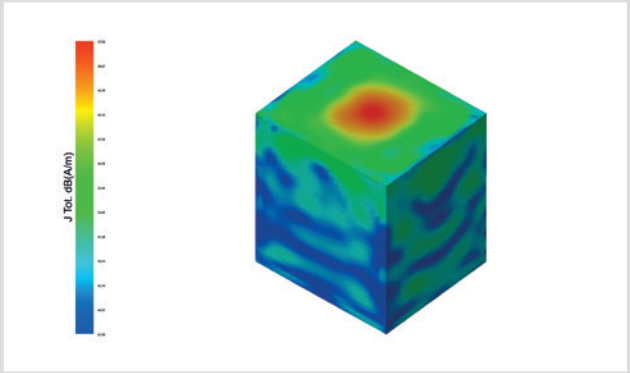
- Evaluate power densities very close to the radiating antenna surface

❷ PREPARATION OF A NF SOURCE FOR CEM TOOLS

Example: **Dual Ridge Horn SH4000 feeding a reflector antenna.**

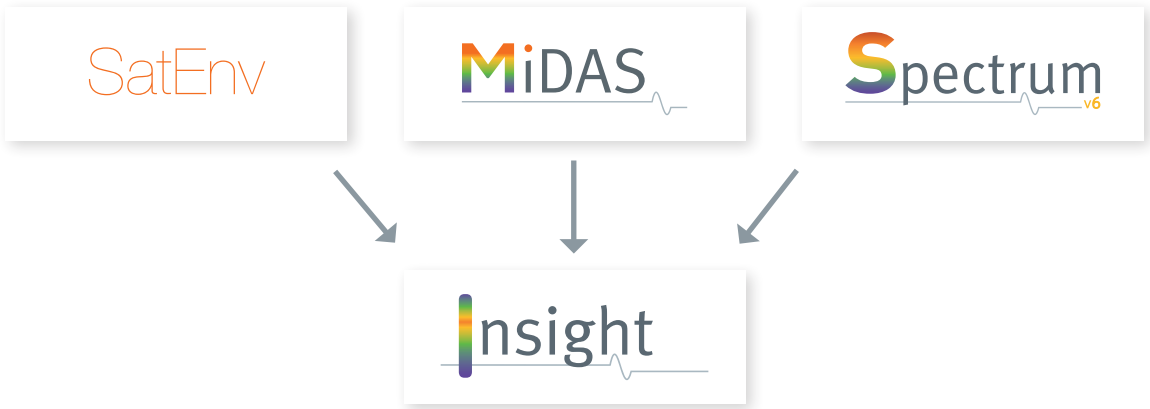
- After measurement of the source antenna (SH4000),
  - load the measurement data: near-field (NF) far-field (FF) or both;
  - create a geometrical surface as a box;

- Compute the reconstructed currents on the box /NF source from the measured radiated field



- Export the NF source (Huygens box) to be used in the CEM tools
- Exported NF sources can be also gain calibrated, for gain normalized radiation patterns in CEM tools

FULLY COMPATIBILITY WITH MVG SOFTWARE: SATENV, MIDAS, 959 SPECTRUM



(*) INSIGHT RELATED PUBLICATIONS

J. L. A. Quijano, G. Vecchi, "Field And Source Equivalence In Source Reconstruction On 3D Surfaces", ELECTROMAGNETIC WAVES (PIER), 2010, Vol. 103, pages 67-100, ISSN: 1559-8985.

J. L. A. Quijano, G. Vecchi, "Near- and Very Near-Field Accuracy in 3-D Source Reconstruction", IEEE ANTENNAS AND WIRELESS PROPAGATION LETTERS, pp. 4, 2010, Vol. 9, pages 634-637, ISSN: 1536-1225.

J. L. A. Quijano, G. Vecchi, "Improved-Accuracy Source Reconstruction on Arbitrary 3-D Surfaces", IEEE ANTENNAS AND WIRELESS PROPAGATION LETTERS, pp. 4, 2009, Vol. 8, pages 1046-1049, ISSN: 1536-1225.

J. L. Araque, L. Scialacqua, J. Zackrisson, L. J. Foged, M. Sabbadini and G. Vecchi, " Suppression of Undesired Radiated Fields Based on Equivalent Currents Reconstruction from Measured data", IEEE ANTENNAS AND WIRELESS PROPAGATION LETTERS, 2011.

2010

L. J. Foged, L. Scialacqua, F. Mioc, M. Sabbadini, J. L. Araque Quijano, G. Vecchi, "Diagnostics and Advanced Antenna Measurement Processing", 32nd ESA Antenna Workshop, ESA/ESTEC Nordwijk NL, October 2010.

2011

L. Scialacqua, , F. Mioc, L. J. Foged, J. L. Araque Quijano, G. Vecchi, M. Sabbadini, "Antenna measurement processing for diagnostics and filtering based on integral equations", IEEE International Symposium on Antennas and Propagation and USNC/URSI July 3-8, 2011, Spokane, Washington, USA.

L. Scialacqua, F. Saccardi, L. J. Foged, J. L. Araque Quijano, G. Vecchi, M. Sabbadini, "Practical Application of the Equivalent Source Method as an Antenna Diagnostics Tool", 33rd Annual Symposium of the Antenna Measurement Techniques Association, AMTA, October 2011, Englewood, Colorado, USA.

2012

L. J. Foged, L. Scialacqua, A. Scannavini, F. Saccardi, J. L. Araque Quijano, G. Vecchi "Experimental Investigation of radiating current distribution and measurement cable interaction on wireless devices" 6th European Conference on Antennas and Propagation, EuCAP 2012, Prague, 26–30 March 2012.

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