Advances in TICRA EM Tools

H.-H. Viskum
TICRA, Copenhagen Denmark, www.ticra.com

Many exciting developments are underway at TICRA, as evidenced by recent and upcoming releases of new EM tools. One of the big news is the release of GRASP 10, which sets new standards for reflector antenna modeling in an efficient and intuitive environment. But major developments are also underway in other areas:

Design of compact reflector antennas is currently receiving significant interest due to the deployment in new bands and for maritime services. The existing CHAMP program for corrugated horn design optimization is being expanded to include main- and subreflector surfaces described in terms of spline functions that can be included in an optimization. A new and highly efficient BOR MoM has been developed, which in combination with the mode-matching in the horn predicts the radiation pattern from the terminal in typically 1-2 seconds. Such speed makes thorough design optimization feasible. The implementation also accounts for any dielectric material that may be present, typically to support the subreflector directly from the feed.

A new type of EM modelling tool has become available with the release of DIATOOL. It applies to antenna diagnostics and filtering and takes as input a measured field. Two techniques are available for reconstructing the sources of the field to visualize e.g. aperture fields and currents on 3D–structures. Source inspection offers a much better potential for identifying errors than far-field inspection. The reconstruction enforces e.g. currents to flow on the actual, physical antenna structure. This also provides the basis for filtering un-wanted contributions, for example by obtaining currents on a feeding cable and eliminating them from a subsequent analysis to see the true antenna performance.

Reflectarray design is a recent discipline at TICRA, with focus on developing fast and accurate analysis methods for printed reflectarrays. Existing tools may characterize the phase response of individual elements but are not applicable to design optimization. TICRA are integrating accurate near-field feed models and spectral-domain MoM characterization of elements with an initial phase-only synthesis followed by thorough optimization accounting for amplitude, phase and angle of incidence, also allowing for irregular element grid. Moreover, the tool can perform accurate analysis of the scattering in support structures etc. in the same way as GRASP.