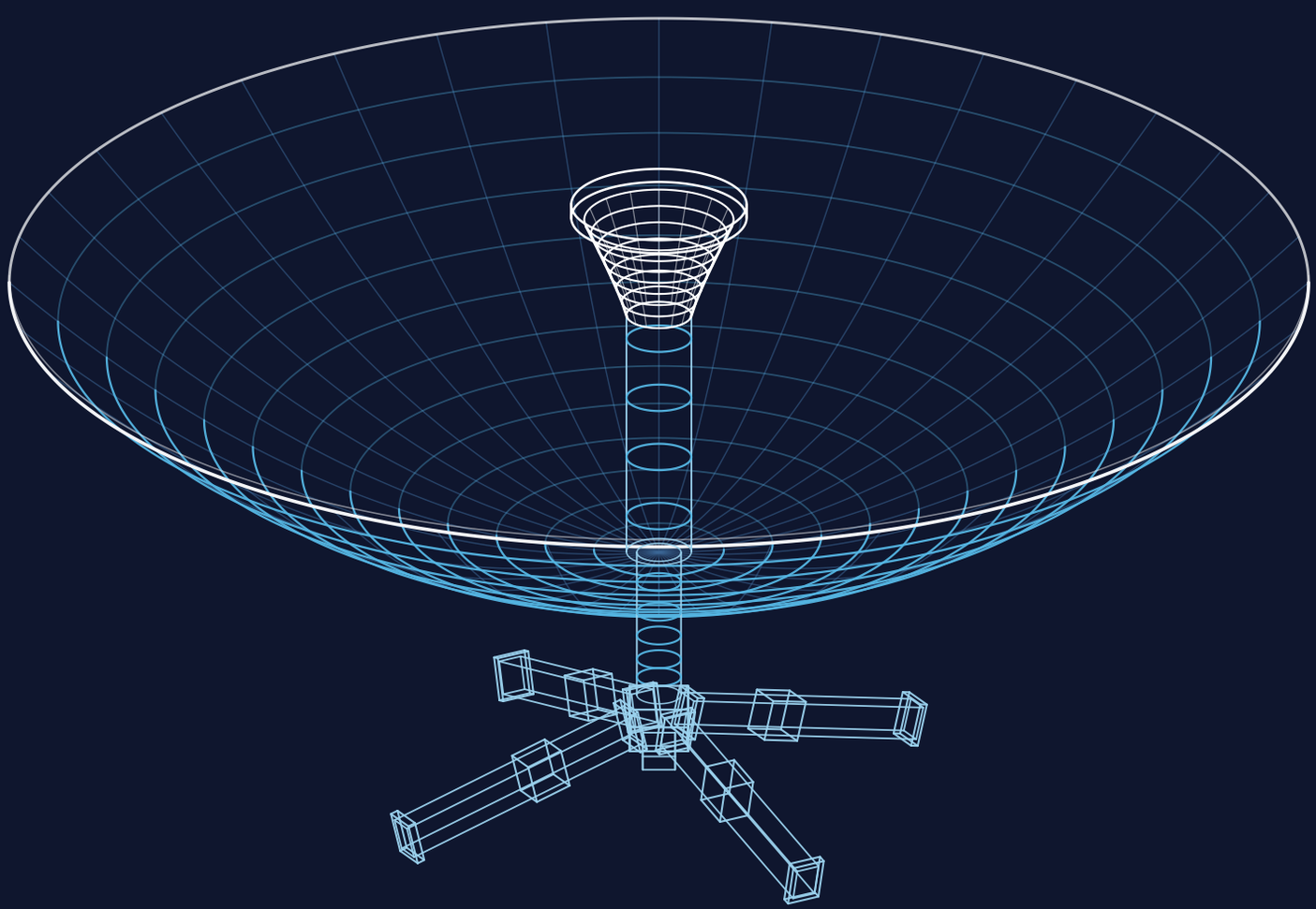
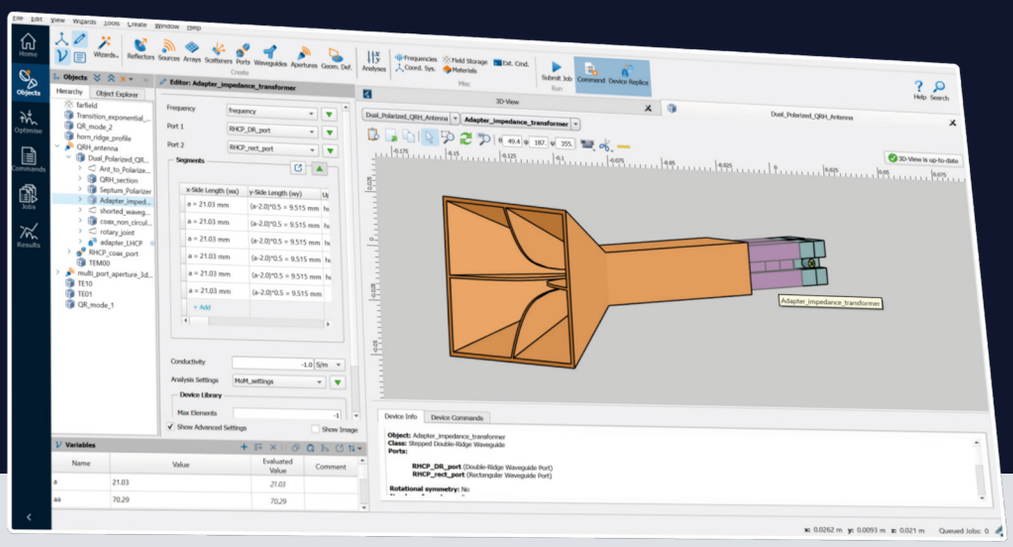
TICRA

CHAMP 3D

Fast and accurate analysis and design of general waveguide components, feeds and rotationally symmetric reflectors.



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Quad-ridged horn antenna with wideband septum polariser modelled in CHAMP 3D.

Design with confidence and speed

Feed chains and waveguide components play a key role in determining the performance of reflector and horn antennas. Horns, waveguide assemblies and multiport components must meet tight requirements on return loss, isolation and radiation pattern, often across several frequency bands.

CHAMP 3D is TICRA's dedicated software for designing and analysing these structures. It selects the most appropriate solver for each component, from analytical expressions and mode matching to higher-order BoR-MoM, 3D MoM and FEM.

Geometries can be built using an extensive library of built-in components, created from scratch using a CAD editor, or imported from CAD files, assigning variables to each desired quantity.

CHAMP 3D combines accurate analysis with fast optimisation. Its Generalised Scattering Matrix approach enables rapid recalculation of complete assemblies, allowing optimised designs to be obtained in just a few minutes.

From waveguide component to complete feed chain

PRODUCT CAPABILITIES

- Set up rotationally symmetric horns and ring-focus reflectors with dedicated wizards in a few clicks
- Calculate S-parameters and radiation patterns
- Recalculate assemblies fast with the Generalised Scattering Matrix approach
- Optimise geometrical variables with goals on primary and secondary patterns in a few minutes

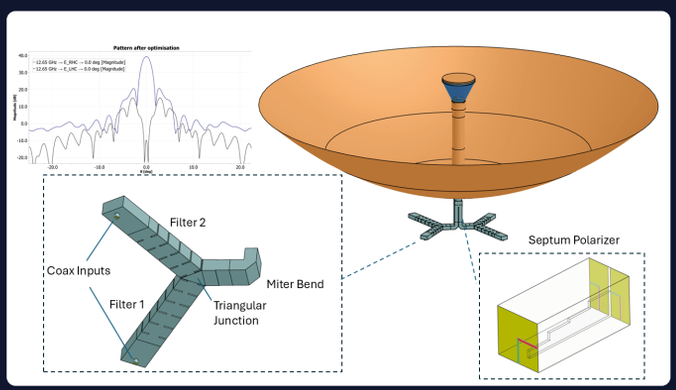
KEY TECHNICAL HIGHLIGHTS

- Automatic choice of the most appropriate solver for each component
- Analytical, mode-matching, higher-order BoR-MoM, 3D MoM and FEM solvers
- Direct 3D geometry modelling with CAD editor, CAD import and built-in components
- Feeds, waveguides and reflectors optimised as one model in one graphical interface
- Global and local optimisation algorithms

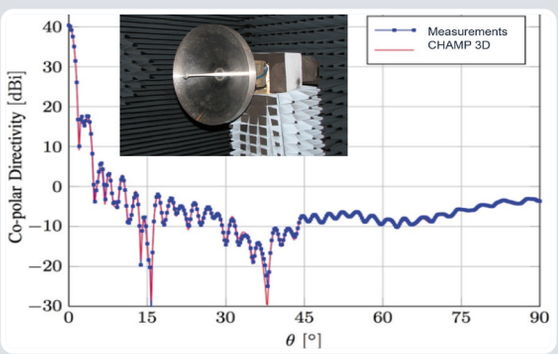
Why CHAMP 3D and TICRA?

CHAMP 3D builds on CHAMP, TICRA's long-standing software for rotationally symmetric feed design, and extends it to general 3D waveguide components and complete feed chains.

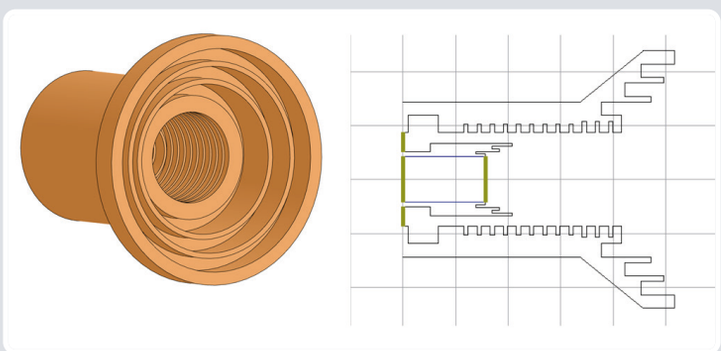
Combined with GRASP in TICRA Tools, CHAMP 3D allows you to optimise feed chains based on the far-field radiation pattern of the complete antenna system, potentially achieving better performance than when optimising the feed chain in isolation.



Optimisation of the four ridge lengths of the septum polariser was performed directly against the cross-polar far field of the complete 1 m antenna in Ku band, in 5 minutes on an 18 CPU-thread computer.



Co-polar directivity of a ring-focus antenna: CHAMP 3D prediction versus measurements.



A coaxial corrugated dual band horn feed: 3D model and 2D view.

Technical highlights

COMPONENT DESIGN

- Axially and radially corrugated horns
- Smooth-wall horns
- Passive multiport waveguide components
- Metallic and dielectric components
- Excitation by arbitrary waveguide modes
- Ring-focus reflectors with dielectric support

SYSTEM-LEVEL DESIGN

- Feed chains optimised for far-field goals
- Single- and dual-reflector systems
- Ring-focus reflector wizard
- VSAT terminals
- Sidelobe roll-off constraints

ADVANCED APPLICATIONS

- Satellite payload feed chains
- Gateway and ground station feeds
- Multi-band feed systems
- User terminals
- CubeSat antenna feeds

Integration with TICRA Tools

Combine CHAMP 3D with GRASP or POS to optimise feed chains for the far-field performance of the complete reflector system, and UQ to quantify the effect of manufacturing tolerances.

Together, CHAMP 3D and ARRAY are particularly efficient for the analysis and optimisation of waveguide and horn arrays.
The result is one consistent environment, from waveguide component and feed-chain design to full antenna-system analysis and validation.

Get in touch

Advance your feed and waveguide design capabilities.

Discover how CHAMP 3D takes feed chains from component design to complete antenna-system performance.

Request a demo or discuss your application with a TICRA engineer.

www.ticra.com/software/champ3d/
info@ticra.com

> **TICRA's software enables us to perform complex electro-magnetic simulations with high confidence. Without these tools, we would not be able to optimise our feed systems or reflector performance in the same way.**

- Viasat, TICRA customer story

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