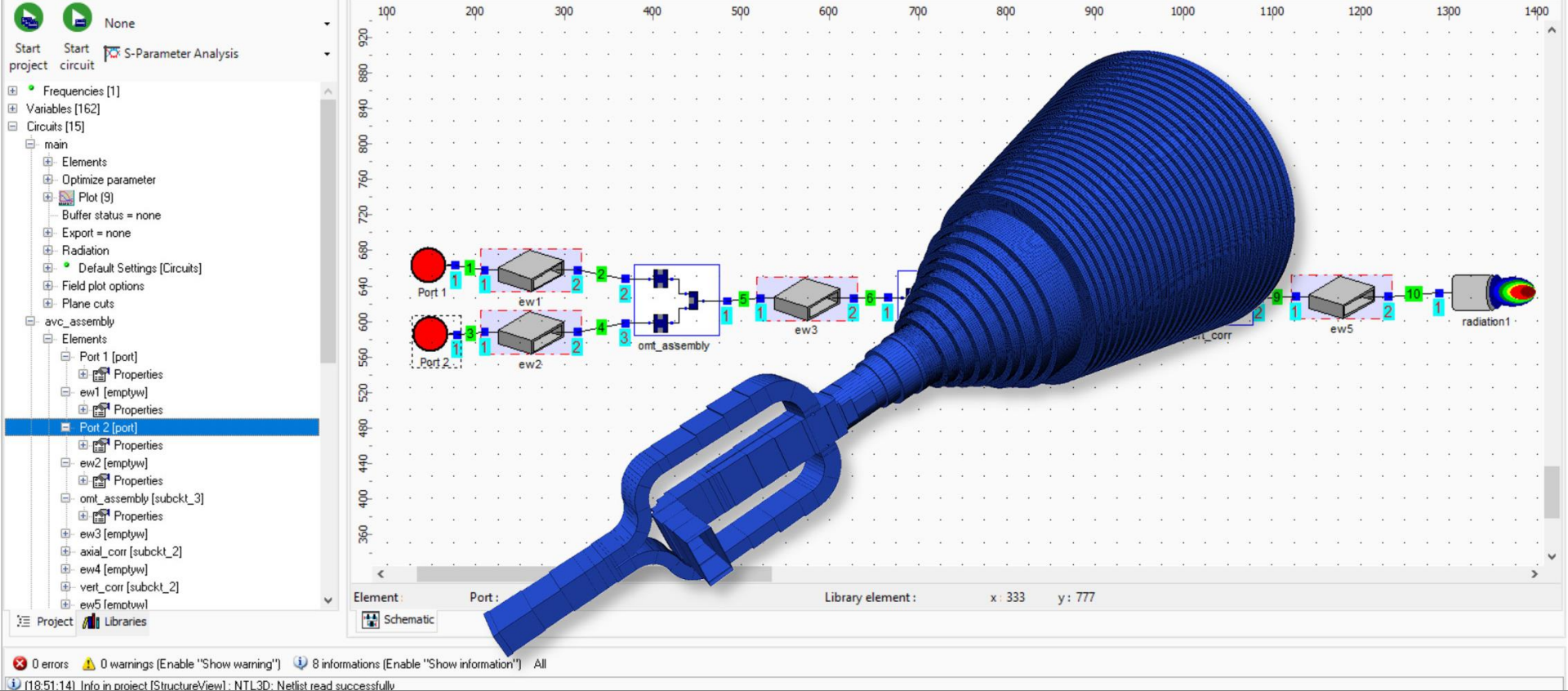


Mician Top Use Cases

µWave Wizard™

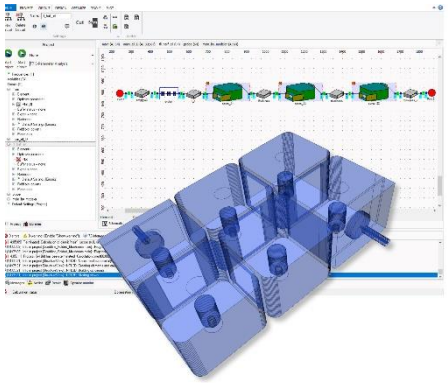
Altair

Partner Alliance

FOLDED COMBLINE FILTER

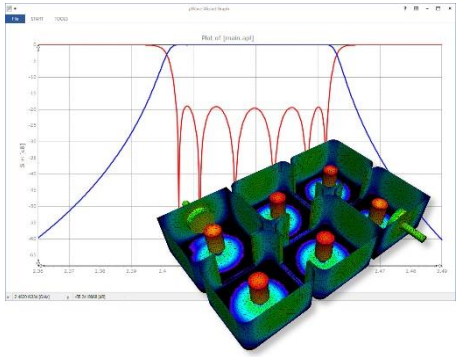
Challenge

- Rectangular waveguide filters are frequently used in current space communications or at high frequencies even on PCBs. At lower frequencies the waveguide filters are getting very bulky. Beside microstrip filters with the lack of power handling, combline filters are very common for filter applications. But the synthesis and optimization is very time consuming in case of solving such filters by full 3D-FEM for example.



Solution

- The compact filter itself is in µWave Wizard™ a simple cascading of single parameterized resonator elements with partial height posts. All resonators are connected with higher order modes which lead to a reliable response in a very short computation time and are suited for a post optimization.



Result

- Due to very good starting values from the filter workbench it is not a big task for a post optimization. The computation time for 500fp (adapted 33/300) is about 30 sec on an Intel i9.

COMPACT ANTENNA FEEDING SYSTEM

Challenge

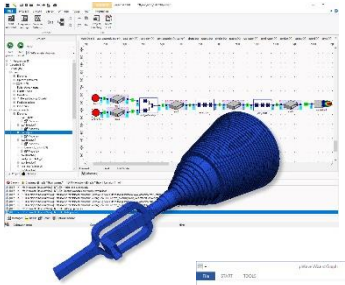
- In order to achieve satisfactory RF performance, interactions between individual components of a complex antenna feed system consisting of waveguide feed network, feed horn and reflectors need to be known and optimized before hand.

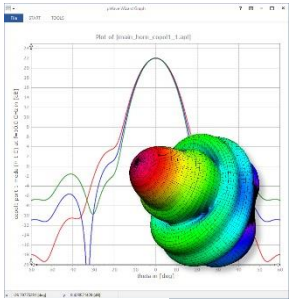
Solution

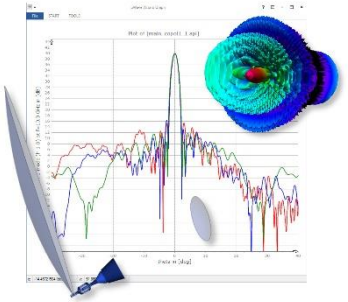
1. µWave Wizard™ Reflector Designer
   - Initial determination of main reflector diameter, introduction of sub-reflector, using geometric-optical formulas for calculating reflector and sub-reflector assembly.
2. Feed Horn Synthesis
   - The geometrical optics design of the reflector yields feed defining parameters necessary for developing a feed horn suitable for meeting specific illumination.
3. Feed Network Design
   - µWave Wizard™ supports several filter synthesis tools and parameterized single components like bends, OMTs etc. to meet specific feeding requirements.

Result

- The reflector with the horn and the feeding network are connected multimodal to one compact assembly. The complete assembly supports an allover optimization within a realistic computation time. Computation time for an analysis: 3fp in about 3min on Intel i9



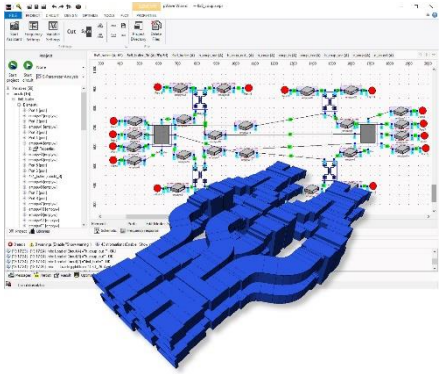




BUTLER MATRIX

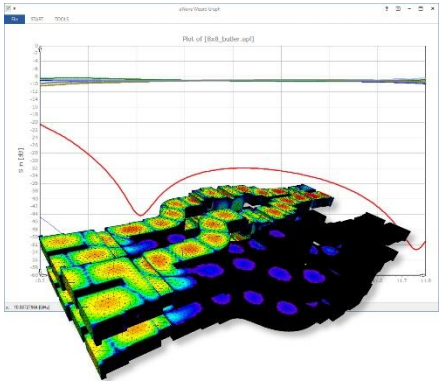
Challenge

- Multiport power amplifier (MPA) networks are becoming more and more attractive for multi-beam communications satellite missions serving the Ku- and Ka- frequency bands. The example shows the flexibility of this general Butler matrix solution in a µWave Wizard™ implementation with a specification for a good matching for the entire Ku Tx-frequency band (10.7 – 12.75GHz).



Solution

- For the design of the 8x8 Butler matrix configurations, the combination of side-wall and top-wall short slot hybrids have been employed in µWave Wizard™. They provide high performance properties over a broad operating bandwidth.
- The interconnection of these two types in combination with suitable bends and compact twists from the µWave Wizard™ element libraries allow the realization of 8x8 Butler matrices without the need on crossover couplers.



Result

- With the fast optimization by µWave Wizard™ the challenge with a broadband design in reasonable size and up to a bandwidth of 17% was realized. A very good power handling can be achieved.
- Computation time 300fp (adapted 32/300) in about 30sec on Intel i9