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Choosing the Right Photonic Design Software

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IntroduDoes the software provide enough exibility to model and analyz pro solution to likely and possible design goals?

- Is the simulation capable of producing results that are not only theoretically feas practically possible?
- Does the software provide a range of simulation solutions that allows you to des devices, as well as the larger photonic systems in which they are used?
- Does the software include a reliable infrastructure that supports both initial and use, such as training, technical support, documentation, development resources technological leadership?

The answers could reveal which software will maximize engineering efficiency and re competitive product.

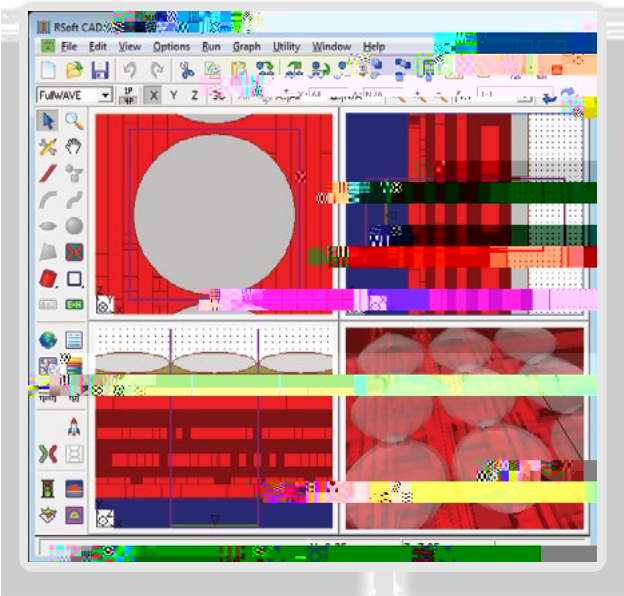


Figure 1. The RSoft CAD graphical user interface (GUI)

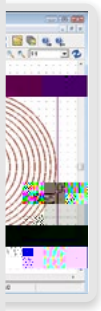
Modeling and Analysis

Photonics systems are rapidly evolving. Technical requirements and technical approaches for these systems are increasing in complexity and performance to such an extent that the limiting factor on the final product

The Finite Differe Time Domain (FDTD) algorithm directly solves Maxwell's equations, but does so in a "brute force" ma that is computationally extremely demanding. Because of the flexibility of the FDTD method to desi system, selecting software with a robust FDTD implementation should be a key decision criteria, particu your design goals do not meet criteria supported by one of the much more efficient and practical algor f your design goals do not require an FDTD solution, then you should ensure that your software supp ner approaches like the Beam Propagation Method (BPM), Plane Wave Expansion (PWE) algorithm, Ri oupled Wave Analysis (RCWA), or the Coupled Wave Mode Theory (CMT) algorithm.

There are m ples of systems or device geometries that are not feasible using FDTD software.

- Large (ength) waveguide-based devices such as couplers, splitters, DWDM, and mode conve asily be modeled with BPM many orders of magnitude faster than FDTD. The BPM meth cable problems, is almost universally faster than FDTD. Consider the star coupler of a Si-! (Arrayed Waveguide Grating): a 3D BPM simulation of such a device is at least 100 time 3D FDTD. So-called 2.5D FDTD methods may work in some limited cases, but not for a pes.
- The res of photonic crystals are more efficiently modeled with PWE than FDTD. PWE sol enstates of a photonic crystal in the frequency domain directly, which gives faster an te results when compared to time-domain based FDTD.
- P gratings can easily be modeled by RCWA. For many structures, the RCWA method is D. Consider a simple Si-based checkerboard grating: a 3D RCWA simulation of this east 50 times faster than 3D FDTD
- s like fiber-Bragg gratings can quickly and efficiently be modeled with CMT. It is not DTD for these structures.



Summary

The decision about which photonic design software to invest in should not be taken lightly. The quality of new products is often incumbent upon the capabilities of the design tool, which can either encourage innovation or limit it. There are many practical technical issues that can maximize the success of photonic design software at a given company, and some of these have been outlined above. The decision should not be based on a cursory technical specification or a single feature; rather, the decision should be based on the overriding goal of reducing costs through engineering efficiency, and maximizing revenue through innovation and competitive advantage in the marketplace. RSoft products continue to deliver capabilities that enable the complex photonic designs of today and accelerate innovation in the global photonics market.

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