RSoft Photonic Device Tools

Features at a Glance

- Rapid virtual prototyping of passive and active photonic and optoelectronic devices

- Discovery of new products with "what if" product scenarios

- Common CAD interface for all tools

- Automatic scanning and parameter optimization

- Scripting in any programming language

Overview

The RSoft Photonic Device Tools provide the industry's widest portfolio of simulators and optimizers for passive and active photonic and optoelectronic devices, including lasers and VCSELs. We are integrated with Synopsys optical and semiconductor design tools for streamlined, multi-domain co-simulations:

- Synopsys CODE V and LightTools products for rigorous modeling of nano-textured optical structures and diffraction analysis

- Synopsys Sentaurus TCAD products for simulations of complex optoelectronic devices.

Key Features

- Highly accurate algorithms allow for rapid virtual prototyping reducing the need for costly and lengthy physical prototyping increasing productivity and decreasing time-to-market.

- Assists in the discovery of new products by creating "what if" product scenarios.

- Each algorithm engine shares a common CAD interface; the software can utilize multiple RSoft packages without having to import designs from one software to the next.

- Scripting can be done with any programming language.

- Includes automated parameter scanning via MOST.

- Each simulation engine is licensed and sold separately, allowing users to choose only those that are relevant to their work.
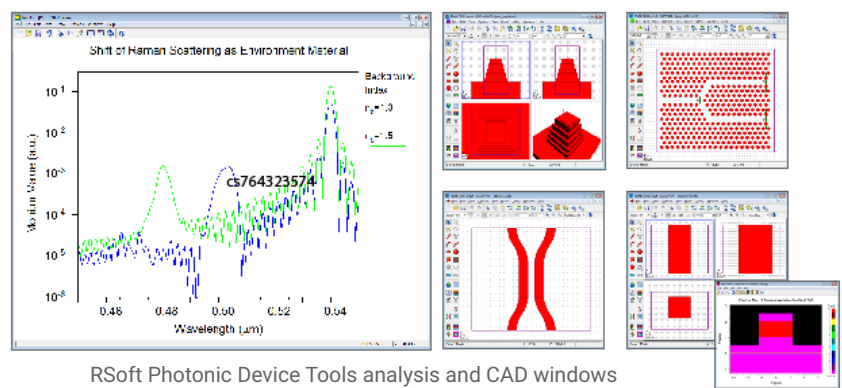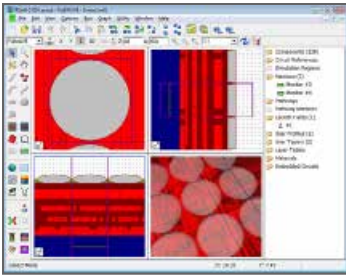
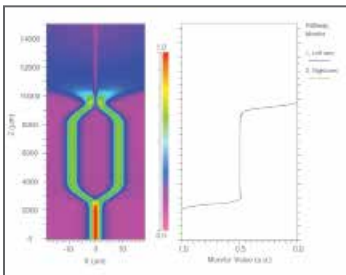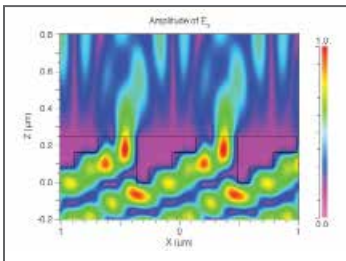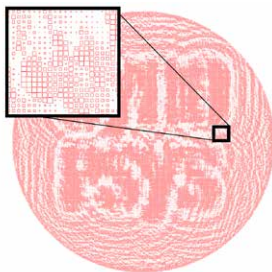RSoft Photonic Device Tools analysis and CAD windows
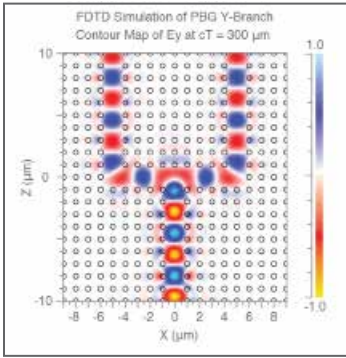
RSoft CAD Environment

RSoft Photonic Device Tools

- **RSoft CAD Environment:** The RSoft CAD Environment is the core program of the RSoft Passive Device Suite and allows researchers and engineers to create systems for the design of waveguide devices, and optical circuits.
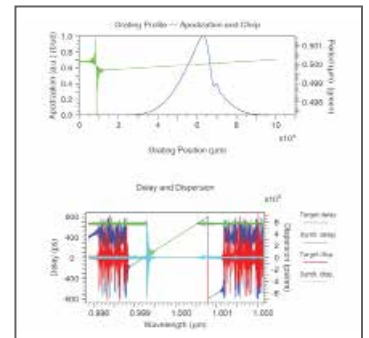
Passive Device Tools

- **FullWAVE FDTD:** This highly sophisticated simulation tool is based on the Finite-Difference Time-Domain (FDTD) method for studying the propagation of light in a wide variety of photonic structures.

- **BeamPROP BPM:** The industry-leading tool based on the Beam Propagation Method (BPM) for the design and simulation of integrated and fiber-optic waveguide devices and circuits.

- **DiffractMOD RCWA:** This design and simulation tool is ideal for diffractive optical structures such as diffractive optical elements, subwavelength periodic structures, and photonic bandgap crystals.

- **BandSOLVE PWE:** This tool is based on the Plane Wave Expansion (PWE) algorithm and is the first commercially available design tool to automate and simplify the modeling and calculation of photonic band structures for all photonic crystal devices.

- **FemSIM FEM**: This generalized mode solver is based on the Finite Element Method (FEM) and can be used to calculate any number of transverse or cavity modes of an arbitrary structure on non-uniform mesh.

- **GratingMOD CMT:** This general design tool based on Coupled Mode Theory (CMT) can be used to analyze and synthesize complicated grating profiles in optical fibers and integrated waveguide circuits for a wide variety of photonic applications.

- **ModePROP EME:** This Eigenmode Expansion Propagation (EME) tool can be used to account for both forward and backward propagation and radiation modes. It provides a rigorous steady-state solution to Maxwell's equations that is based on the highly-stable Modal Transmission Line Theory. A full array of analysis and simulation features make this tool flexible and easy to use.

- **MetaOptic Designer**: MetaOptic Designer automatically generates metalenses and metasurfaces for optimal design performance. Designers at all levels of expertise can create novel metalens designs quickly and easily.

FullWAVE FDTD

BeamPROP BPM

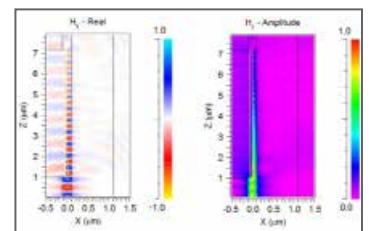DiffractMOD RCWA

MetaOptic Designer
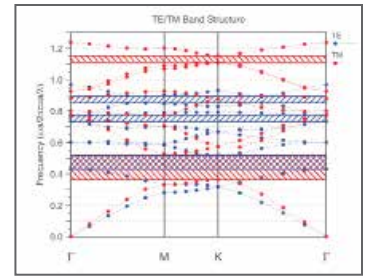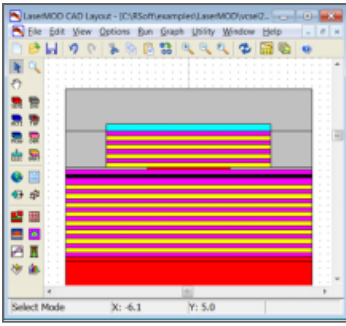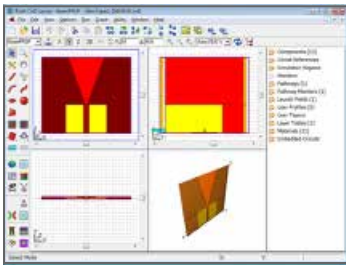

BandSOLVE PWE
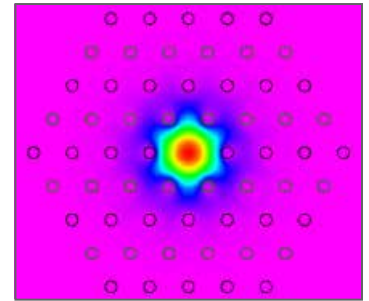
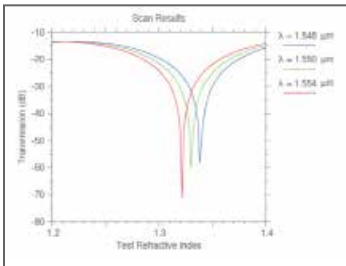FemSIM FEM

GratingMOD CMT

ModePROP EME

LaserMOD

Tapered Laser Utility

MOST

Active Device Tools

- **LaserMOD:** This tool is designed to simulate the optical, electronic, and thermal properties of semiconductor lasers and similar active devices.
- **Tapered Laser Utility:** This utility provides an efficient and accurate design tool for analyzing and optimizing tapered semiconductor laser diodes.

Other Options & Utilities

- **MOST:** The Multi-Variable Optimization and Scanning Tool (MOST), is an exciting solution to the critical problem of design optimization for photonic devices. During the research or design cycle, it is crucial to understand the full parameter space of the system. Acting as an automated driver for the RSoft physics-based simulators, MOST takes the drudgery out of these important operations by streamlining the definition, calculation, and analysis of scans and optimizations. If you own multiple RSoft product licenses, MOST can automate the distribution of work across your entire network with virtually a single mouse click.
- **LED Utility:** Use this tool to accurately simulate next-gen LED structures and all materials involved in their design. This utility simplifies common tasks and assists in the rigorous computation of extraction ratios and radiation patterns.
- **Solar Cell Utility:** This utility provides an optical and electronic simulation solution for solar cell devices. Use this utility to aid in the computation of J-V curves, quantum efficiency spectra, and overall cell efficiency.
- **Multi-Physics Utility:** This utility can be used in conjunction with any of the RSoft passive device simulation tools. It provides a convenient interface for including disturbances of the refractive index profile of a structure in a simulation.
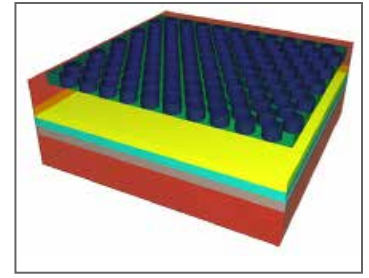
LED Utility
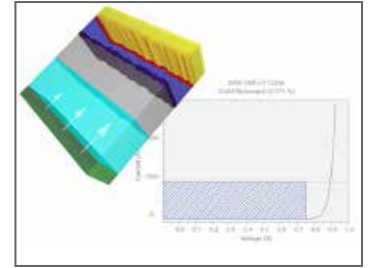
Solar Cell Utility Solar Cell Utility
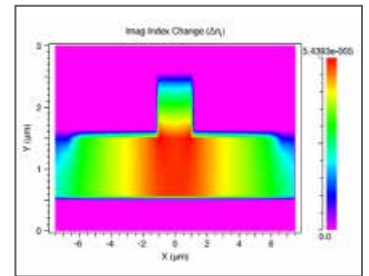
Multi-Physics Utility

Speeding Development with Cloud Computing

In today's fast-paced tech industry, businesses are increasingly seeking solutions that can speed up their development process without the burden of building and maintaining infrastructure. Synopsys offers a unique solution to this challenge with its Cloud Software-as-a-Service (SaaS) solution. Synopsys Cloud SaaS provides access to virtual machines optimized specifically for the RSoft Photonic Device Tools, allowing businesses to focus on leveraging the power of these tools rather than on infrastructure setup and maintenance. Synopsys Cloud SaaS not only reduces development costs but also accelerates time to market. To understand how Synopsys Cloud SaaS can transform your business, reach out to our sales team at osg_sales@synopsys.com.