OFC - Los Angeles, CA • Booth 2029 • February 2004

RSOFT Design Group

REVIEW

Volume 3 Number 1

RSoft Design Group Forges Ahead With Technology Breakthroughs

BandSOLVE and FullWAVE: A Winning Combination for PBG Design

Photonic crystals comprise one of the most rapidly developing areas of photonic research and are regarded as one of the main building blocks for next generation photonic integrated circuits. They promise a variety of benefits such as compact devices and low-noise, low-threshhold lasers. While the benefits are obvious, the design process for these structures requires sophisticated modeling software.

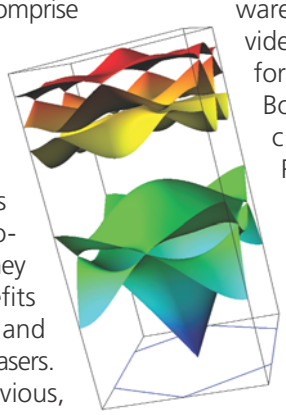


Figure 1 - Equi-frequency surfaces for a standard hexagonal lattice.

RSoft Design Group's *BandSOLVE*™ and *FullWAVE*™ are complementary software packages and together provide the complete design solution for the study of PBG applications. Both products are fully graphical components in the RSoft Photonics Suite and share a common CAD interface. This CAD interface has received numerous updates, including new hierarchical design options which greatly simplifies the creation of PBG structures.

Since OFC 2003, there have been rapid developments in both tools to keep pace with the progress in photonic crystal research.

BandSOLVE

BandSOLVE is the first commercially available simulation tool for the calculation and analysis of band structures of 2D and 3D photonic crystals. It includes advanced array layout utilities for standard crystal types such as diamond, FCC, and BCC lattices, photonic bandgap fibers and photonic crystal slabs, and allows users to draw arbitrarily-complicated crystal structures. The default simulation method in *BandSOLVE* is based on the plane wave expansion (PWE) algorithm, which is one of the fastest computational methods for band structure calculation, and is capable of characterizing most PBG structures. *BandSOLVE* also incorporates an FDTD algorithm useful for dispersive and

continued on page ii

OptSim 4.0: Racing to the Future of Optical Communications System Design Software

Since the announcement of its acquisition of *OptSim*™ from ARTIS last year, RSoft Design Group has been working hard on merging the *OptSim* and *LinkSIM* optical communication system simulation tools into one industry-leading platform. Now, RSoft is proud to announce the release of *OptSim* 4.0, the culmination of this great effort. This new product is the most technically advanced software of its kind while also maintaining an exceptionally intuitive ease of use. It is the ideal solution for simulation, validation, and design of optical communications of all types including all-optical networks, DWDM/OTDM amplified systems, ultra long-haul terrestrial and submarine systems, CATV/Digital/Analog systems, metro area networks, and optical LANs. Moreover, its optional integration with *ModeSYS*™, the industry's only multimode optical link simulator that models both the temporal and spatial characteristics of multimode communications, makes it the only solution for systems utilizing both single-mode and multimode optical fiber.

continued on page iii

WHAT'S INSIDE

(BandSOLVE and FullWAVE continued from front page)

metallic systems.

BandSOLVE's two simulation engines have been extended to new material types and have received numerous optimizations for both speed and accuracy. Both engines can now incorporate arbitrarily oriented anisotropic materials. The PWE engine has been improved to exploit lattice symmetries to produce up to 40% faster results. Additionally, mode seeding can be used to accelerate the convergence process resulting in a faster simulation. The FDTD engine now handles the complex simulation setup with ease using a new interface and improved procedure. Additional improvements have been added which improve the simulation of metallic PBG structures.

New output options include equi-frequency contours and surfaces (see Fig. 1) as well as improved filtering which provide additional information crucial for the study of strong dispersion in crystal systems outside the band gap for applications such as highly tunable beam steering or collimation using superprism effects. When calculating the bands for a photonic crystal slab, *BandSOLVE* can now include light cones for complex periodic cladding structures as well as asymmetrically cladded structures.

FullWAVE

FullWAVE, first released in 2001, was the first commercial simulation tool for PBG applications based on the finite-difference time-domain (FDTD) algorithm. The FDTD algorithm is a rigorous, inherently full-vectorial simulation method. *FullWAVE*'s mature formulation of the FDTD algorithm is optimized for both speed and accuracy and is well suited for the study of both 2D and 3D nanostructures such as PBG based devices. *FullWAVE* is designed to work with arbitrary structures and can incorporate a wide variety of material systems.

One of the key features of *FullWAVE* is the clustered simulation capability, without which large 2D simulations would be prohibitively time consuming and large 3D simulations near impossible due to computational expense. In the last year, the cluster capability has been significantly enhanced for speed, memory usage and usability. Figure 2 shows a typical speed up curve for a 30 node PC cluster. In addition, the non-cluster FDTD algorithm has also been improved to achieve a sizable speed benefit without sacrificing accuracy.

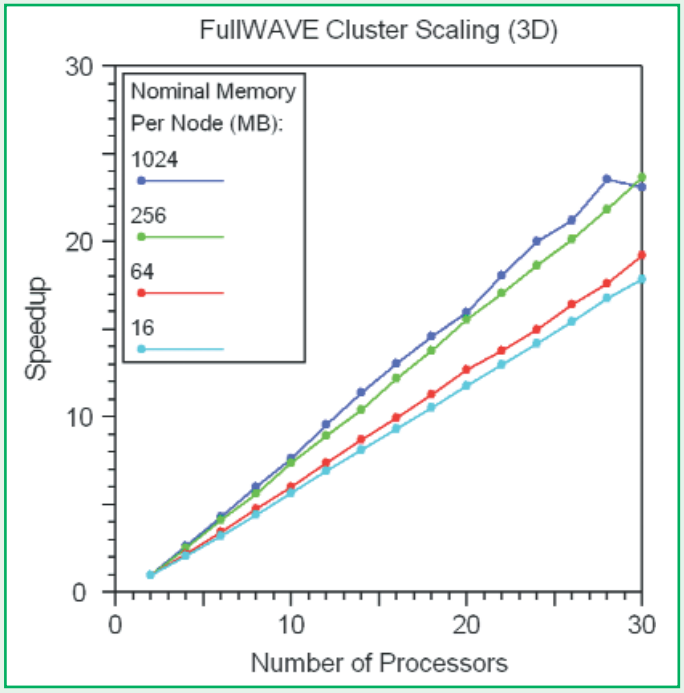


Figure 2 - Speed up curve for a 30 node *FullWAVE* cluster.

FullWAVE has been expanded to allow simulation of more complex material systems, as well as greater excitation flexibility. User control over both permittivity ©and permeability μ is now possible. Multiple Lorentzian models for both dispersion and nonlinearity have also been added for both ©and μ. This allows for the study of negative refractive index PBG structures. Additional flexible excitations have been implemented to allow multiple point and dipole sources, polarization control, as well as arbitrary launch positions and angles.

FullWAVE now includes powerful utilities to output, monitor, and analyze common electromagnetic quantities such as field, power, the Poynting vector, and energy densities to simplify the post-processing process. Additionally, both FFT and DFT schemes are now available for improved spectrum analysis.

Getting the Complete Picture - Using BandSOLVE and FullWAVE Together

BandSOLVE and *FullWAVE* provide complementary views of the properties of a photonic crystal. Since both tools are components of RSoft's Photonic CAD Suite, design files can be easily exchanged between them making a hybrid analysis possible. *BandSOLVE* analyzes the properties of a periodic lattice and can solve for parameters such as mode profiles, polarization properties, parity, group velocities, and equi-frequency surfaces. *FullWAVE* can calculate parameters such as transmission/reflection coefficients and the insertion losses of finite PBG devices. It can also calculate out-of-plane losses in slab photonic crystals and decay rates for photonic crystal defect states. Together these products give a complete picture of a photonic crystal device.

Future Development

RSoft Design Group is committed to continue to develop new simulation techniques in *BandSOLVE* and *FullWAVE*. For example, the FDTD *BandSOLVE* engine will be clustered to increase simulation speed. In *FullWAVE*, advanced layout capabilities and optimization schemes will be implemented for the study of large complicated PBG-based photonic integrated circuits. Additionally, new tools are in development for fast surface diffraction modeling (see P.6) and photonic crystal fiber modeling. Some of these R&D efforts have already been funded by government contracts (see Page viii). When combined with RSoft Design Group's existing simulation technology, these new tools will provide a full design solution for PBG applications.

(OptSim continued from front page)

Twin Engines

RSoft recognized the complementary nature of *OptSim* and *LinkSIM* when it acquired *OptSim* last year. In *OptSim* 4.0, the two simulation engines and all their associated models have been integrated into the same framework to expand the range of approaches users can take to addressing simulation challenges. *OptSim* 4.0 now provides a block-mode simulation engine that excels at fast simulations of systems using sequence lengths up to thousands of bits long, as well as a sample-mode simulation engine that excels at longer simulations of systems using unlimited sequence lengths. The block-mode uses the Split Step Fourier method, while the sample-mode uses the Time Domain Split Step method to simulate the nonlinear optical fiber. RSoft and its partners have extensively validated both engines and their associated models against one another, and found them to be in very good agreement. *OptSim* 4.0 users will now have two complementary methodologies at their disposal when performing simulation studies and design optimization of their systems.

Additionally, users of each existing tool will benefit from the addition of the models from the other tool in *OptSim* 4.0. The new package includes best-in-class models for components such as VCSELs, SOAs, EDFAs, Raman amplifiers, optical fiber, and receivers, to name a few. Many of these models include scientific innovations recognized through peer-reviewed technical publications by our staff members. *OptSim* 4.0 also provides a powerful capability for simulating transients in networks with power fluctuations due to added and dropped channels.

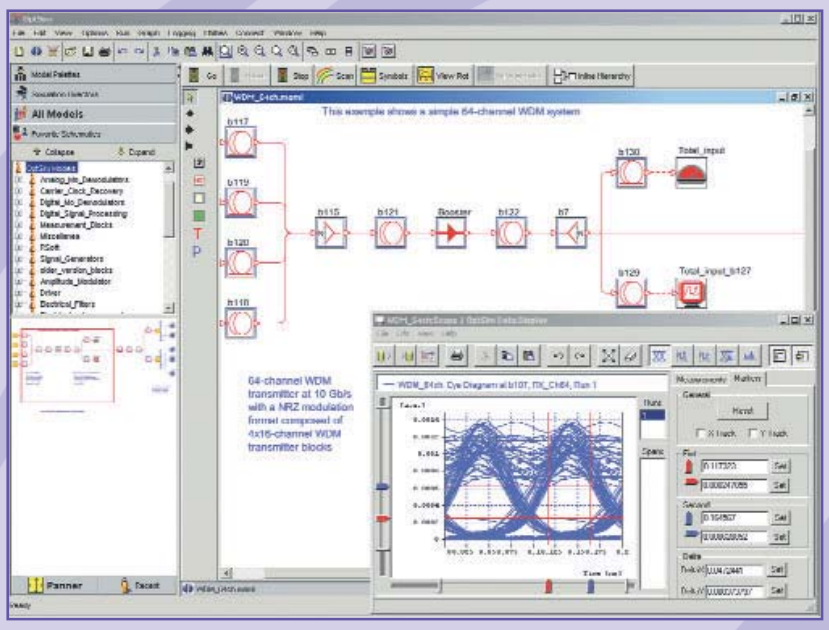


Figure 3: OptSIM 4.0's new Graphical User Interface

New Streamlined Body

OptSim 4.0 sports a brand new advanced user interface, shown in Figure 3. Not only is it more powerful and user-friendly than ever before, it is also user-customizable. While being completely new with many powerful features, it also has retained much of the familiar look and feel that customers of both *LinkSIM* and *OptSim* expect. For example, all the component icons from both tools remain the same in *OptSim* 4.0. Some of the powerful new features are highlighted below:

- A new "panner" in the lower left hand corner allows the user to view a reduced image of the entire schematic when zoomed into a smaller portion in the schematic editing window.
- The schematic editing window features text annotations, user-customizable component icons, unlimited zoom levels, configurable connection paths between blocks, simulation animation, and a cleaner, more professional appearance.
- The model palette has been replaced with several flexible model selection features including multiple user-customizable palettes for different model categories, a tree-based model selection window, and a recently-used model palette. It is now easy to access any of the over 400 models provided with the software and build your own custom model palettes.
- New powerful features make it easier to create and use compound components (known as "superblocks" in *LinkSIM*).
- Powerful encryption capabilities make protecting your schematics and model parameters easier than ever.

Loaded With Extras

In addition to the powerful modeling and simulation technology that users of *OptSim* and *LinkSIM* have come to expect, *OptSim* 4.0 incorporates many additional features:

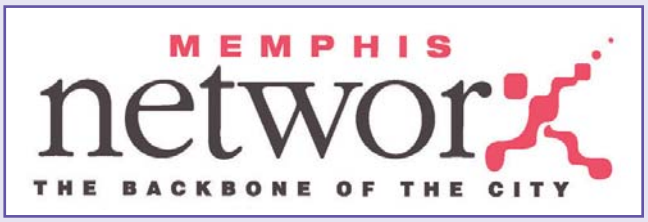
- Best Fit Laser Toolkit makes customizing powerful rate-equation laser model parameters to fit desired performance characteristics easy.
- SPICE interface bridges the gap between electronic circuit and optical communication system simulation. This unique feature makes laser driver circuit design and system modeling easier and more accurate than ever before.
- Powerful MATLAB® interface makes it easy to develop your own models and customize and extend the simulation and analysis capabilities.
- Extensive predefined manufacturer component database makes it easy to model commercially available components.
- Intuitive and flexible measurement post-processing graphical interface that acts as a virtual laboratory instrument.

Great Trade-In Options

OptSim 4.0 is provided for no additional charge to customers current with their *LinkSIM* or *OptSim* maintenance contracts. It is a natural upgrade for both tools, fully supporting all existing project files, topology files, compound components, and user models of both *LinkSIM* and *OptSim*. No matter which tool you presently use, you will be able to continue working on your existing projects in *OptSim* 4.0 without recreating any schematics.

Contact RSoft for information on how to upgrade to the latest release to take advantage of all these great new capabilities.

RSoft Design Group Interview with Memphis Networx



The creation of metropolitan optical networks poses challenging design choices. RSoft Design Group has recently discussed metro networkx planning with Albert Crews, Director of Engineering at Memphis Networx.

Albert Crews has over a decade of experience in Internet technology and communications service sectors, including Sycamore Networks, Bell-South and FedEx and has been a spokesperson in many industry forums.

RSoft Review (RR): Will you give us an introduction about Memphis Networx?

Albert: Memphis Networx is a privately held company founded in 1999. Through our state-of-the-art DWDM network and world class Technology Center, Memphis Networx addresses the needs of companies who demand the latest in communications technology. Our suite of metro services includes SONET, Ethernet, Collocation, and Optical Wavelengths.

RR: In deploying a new generation optical network, what kind of network planning challenges did you face?

Albert: A metro network is dense and complex, coupled with the uncertainty of traffic demands, new platforms and technologies. These factors increase the difficulty of achieving the most economical network architecture. Network designers simply can not follow the rules of long-haul networks to deploy optimized metro networks.

RR: Well, that means we have to consider a new set of attributes for metro networks - Is there any benefit of using a commercial planning tool?

Albert: Solving these challenges internally is almost impossible. With limited resources and a dynamic environment, the risk involved with developing these capabilities would harm our core business.

Furthermore, vendor-specific tools are inadequate, as they 'box' a network designer into a closed architecture. We follow a 'generic box' philosophy to offer flexible solutions, where the customer's application is considered first to ensure achievement of the most economical and optimized network solution.

As a result, metro network architects and designers are in great need of a flexible commercial network planning solution such as *MetroWAND*. A vendor-neutral tool like *MetroWAND* will really allow various equipment providers, operators and carriers to work together.

RR: Given the complexity you have described, how can network planners be confident about their network design?

Albert: A network planning and analysis solution such as *MetroWAND* allows network planners to efficiently perform "what-if" analyses considering the tradeoffs among different vendors and architectures, and achieve the most cost effective and optimal design. It is very time-consuming, if possible at all, to do it manually.

RR: What made *MetroWAND* your tool of choice?

Albert: In addition to what I have already mentioned, other capabilities must be considered. For example, ring versus mesh topology optimization, modeling of new generation Multiservice Provisioning Platforms (MSPPs), metro core and access rings, and data transport services such as metro Ethernet. Also, the continued optimization of deployed network infrastructure must be explored. In our exhaustive search for a network planning and analysis solution, we found all of these features in *MetroWAND*.

RR: What are other reasons why you chose *MetroWAND*?

Albert: I would say technical support, company's credentials and product roadmap. RSoft Design Group is well positioned in the marketplace and well equipped with high caliber technical know-how.

RR: What are your thoughts about future needs?

Albert: We are just at the beginning of the metro network evolution. These networks are rapidly evolving into multi-protocol, multi-service, and multi-architecture environments; meeting the unified communications needs of the future. We see that *MetroWAND* is ideally suited to meet the requirements.

RSoft Design Group at University Centers Worldwide

RSoft Design Group offers design tools for optoelectronic component simulation, optical communication system modeling, and optical network cost optimization and strategic analysis, thus covering the full spectrum of photonics design automation software. While these tools have found widespread use throughout the industry, their use is just as prevalent at academic institutions around the world. Many photonic centers use RSoft packages to conduct cutting edge research and educate new generations of engineers. Some also successfully collaborate with RSoft to develop next generation photonic technology.

The Photonics Center at **Boston University**, founded to develop and commercialize photonics products and to train engineers in the use of photonics technology, adopted RSoft's packages about three years ago and has also recently added several new RSoft tools. "RSoft's complete line of packages has lent itself to the Center's mission very well," said Assistant Director, Dr. Cliff Robinson. "Moreover, RSoft has been very supportive to the center's activities and we hope to continue to broaden the partnership." For the newly started Center for Optical Technologies (COT) at **Lehigh University**, the RSoft design suite is the package of choice for both research and teaching. Professor James Hwang, the Interim Director of COT, said, "Lehigh COT has a wide range of research activities including both passive and active components as well as system level research. As an academic institution, training the next generation of engineers and scientists is also crucial to the center's mission. Our center chose RSoft because it has a complete set of tools and has been very supportive and flexible to meet our needs for both research and teaching."

RSoft's support for universities goes beyond domestic borders. The **University of Linz** leads a photonics research consortium that includes several universities in Austria and Czech Republic. "For our SGI ALTIX supercomputer, RSoft bought a similar computer, specifically compiled an ALTIX version, and provided special licensing schemes for our research and teaching needs. We appreciate the attention RSoft has given us," said Professor Kurt Hingerl.

Not only does RSoft provide specially tailored packages of design tools at an academic discount to meet various university needs, RSoft also collaborates with universities to develop next generation photonic technologies. The Director of **CUDOS (Centre for Ultra-high Bandwidth Devices for Optical Systems)** at the University of Sydney, Professor Benjamin J. Eggleton, said "RSoft's simulation tools have been very useful in all areas of our work throughout the CUDOS network, including detailed band structure and time-domain simulations of novel micro-structured fiber devices as well as system simulations of nonlinear fiber problems. Moreover, RSoft actively participates in our theoretical and experimental research programs."

Columbia University in New York City has a long history with RSoft. "Our relationship started when the first RSoft product was spun off from Columbia. The recent collaboration in the NIST PCAD program has been very successful and we are about to start an Air Force STTR program with RSoft on PBG research," said Professor Richard Osgood. "My group now also has an 18-node *FullWAVE*™ cluster. It allows us to study very complex optical phenomena and to solve computationally intensive problems, which are at the cutting edge of new device concepts."

As these researchers around the world have found, RSoft is dedicated to supporting and promoting photonics research and education in universities worldwide. "The interaction and collaboration that we have had with universities has greatly enhanced the research and teaching on campus as well as assisted in the development of our products," says RSoft's CTO Rob Scarmozzino. He adds, "We are excited to continue to broaden our partnerships with the academic community, as it fosters research and engineering efforts within the photonic sciences."

Panduit Teams up with RSoft for Multimode System Design

The Fiber Research Group of Panduit Corp. has been using RSoft Design Group's *ModeSYS*™ multimode system-level simulation tool (formerly known as the *LinkSIM* Multimode Simulation Platform™) to analyze the performance of its optical networking products. One key element in Panduit's program is the modeling, testing, and measurement of 10-Gigabit Ethernet (10 GbE) systems per the IEEE 802.3ae standard. Optical connectivity in the Enterprise market is based primarily on multimode fiber; the bandwidth requirements for this installed fiber infrastructure are being pushed from data rates of 100 Mb/s to 10 Gb/s. Panduit recently used the eye-diagram analysis capability of *ModeSYS* to successfully assess the enhanced bandwidth requirements for different types of digital fiber-optic systems.

Panduit researchers have the capability to make routine eye-diagram measurements on fiber systems at high data rates. In the laboratory, they used a pseudo-random binary sequence (PRBS) generator to simulate actual digital telecommunication signals and drove an optical signal generator whose output was suitable to drive an optical source. Panduit researchers launched light at 850-nm into a multimode fiber and used a variable optical attenuator to control light levels to ensure the optical receiver was not saturated. They then captured and analyzed eye diagrams produced by this testbed.

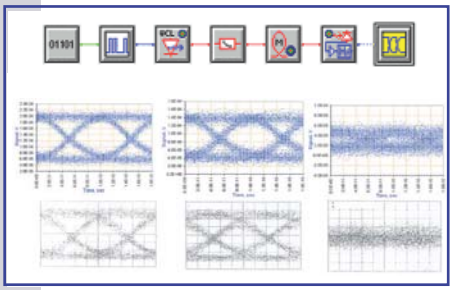


Figure 4: a) *ModeSYS* topology b) comparison of *ModeSYS* simulation (top) and Pandiut experimental (bottom) results for short, intermediate, and long distances

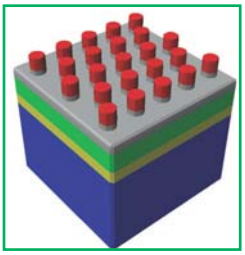
These same measurements were simulated with *ModeSYS*. The topology, shown in Figure 4a, was constructed to mimic Panduit's lab set up. The models in this topology are (left to right) PRBS generator, laser driver, VCSEL, optical attenuator, multimode fiber, photoreceiver, and eye diagram analyzer. Each component in the *ModeSYS* topology was adjusted to closely match the corresponding lab component. For example, pulse rise and fall times, noise levels, and fiber attenuation were all matched with actual component values. Figure 4 shows a comparison of *ModeSYS* simulations with lab data, indicating a close agreement between the measured and simulated eye diagrams.

The *ModeSYS* simulation correctly predicted the observed eye closure as seen in the intermediate and long fiber lengths of Figure 4b. *ModeSYS* also correctly predicted that the eye opening would be maintained when extending the distance from short to intermediate lengths. Panduit used these *ModeSYS* eye analysis capabilities to assess the net bandwidth capacity of their system-under-test.

As with all of our customers, RSoft's technical support staff worked closely with Panduit to optimize their use of *ModeSYS*. In turn, Panduit gave RSoft valuable feedback on desirable new features. This is a good example of the type of collaborative relationship that RSoft strives to foster with all of its customers.

DiffractMOD - A New Tool for Surface Diffraction Modeling

DiffractMOD™ is a new design tool for periodic diffractive optical structures such as surface normal gratings, subwavelength periodic structures, and photonic bandgap crystals. It employs one of the most efficient methods to simulate electromagnetic wave diffraction from periodic structures, including subwavelength devices. *DiffractMOD* is well-suited to a variety of photonic applications including polarization sensitive devices, artificial dielectrics, photovoltaic systems, three-dimensional displays, focal plane imagers, spectroscopy, microlens arrays, spectral filters, and beam splitters and shapers. It can also be used in semiconductor-manufacturing process for optical profilometry and nano-metrology.

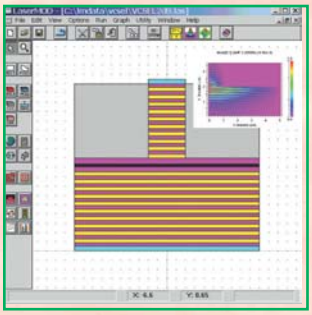


DiffractMOD is based on the Rigorous Coupled Wave Analysis (RCWA) method and implements several optimizations such as a fast converging formulation of Maxwell's equations and numerical stabilization. The RCWA method uses the concept of a unit cell to handle both 2D and 3D periodic structures

continued on page vii

LaserMOD 2.0 Released with New Cutting Edge VCSEL Simulation Capabilities and New Self-Heating Model

Semiconductor lasers are key components for optoelectronic systems including communication systems. Increasingly stringent requirements for bandwidth, tunability, power dissipation, temperature stability, and noise are being placed on these devices. Vertical cavity surface emitting lasers (VCSELs) have proven to be cost efficient, offering improved properties with respect to mode selectivity, fiber coupling, threshold currents, and integration into 2D arrays. In order to reduce development cost and decrease time to market, simulation tools are essential to design and optimize these advanced laser structures.



RSoft Design Group's recently released *LaserMOD*™ 2.0 addresses these semiconductor laser modeling needs. *LaserMOD* 2.0 combines the most versatile, user-friendly, and easy to learn GUI in the market with a powerful, robust simulation engine which provides for the self-consistent solution of electro-thermal transport and optical field propagation.

LaserMOD offers comprehensive VCSEL simulation capabilities. A set of new features has been added to cope with specific VCSEL simulation requirements. The user-friendly CAD interface extends its convenient and intuitive layout capabilities to the easy specification of VCSEL designs by providing a new distributed Bragg reflector (DBR) element. The new Transfer Matrix based mode solver allows for fast computation of the cavity spectrum of eigenmodes. An interface for utilizing other RSoft mode solvers is in place. *LaserMOD* can perform full 3D VCSEL simulations quickly by taking advantage of the cylindrical symmetry of the device.

LaserMOD also now includes the physical modeling of thermal effects. Self-heating under CW operation is known to affect semiconductor laser characteristics significantly. These effects are especially important to VCSEL operation due to low thermal conductivity. In order to model thermal effects on carrier transport, light emission, and mode patterns, a newly implemented lattice heat flow equation can be solved self-consistently to determine the temperature distribution within the device resulting from various heat sources.

Several additional enhancements are included in *LaserMOD* 2.0, some of which are specifically designed to accommodate VCSEL simulation requirements. Quantum correction models for carrier transport across heterointerfaces, such as tunneling and barrier lowering, have been added. Arbitrary doping and material composition profiles can now be specified and viewed through a designated CAD editor, allowing the definition of features such as pulsed doping at DBR interfaces or the use of graded heterojunctions. The overall accuracy and predictability of the simulator has been improved by adding doping and temperature dependent mobility models including associated material specific model parameters. Absorption from continuum states can now be included for the accurate determination of the quantum well refractive index as a function of bias conditions. Additionally, advanced many body gain spectra can be utilized via the gain database interface for highly accurate simulations. A library for GaInAsP/InP quantum wells targeting a 1300nm emission wavelength is now available.

RSoft is now working on future releases of the tool that will address DFBs, SOAs, LEDs, and PBG cavity-based lasers. *LaserMOD* will also be further integrated with both RSoft's passive device tools and system simulation tools to provide complete component design and system design capabilities. *LaserMOD* is well positioned to meet the design needs for optoelectronic integrated circuits. ■

DiffractMOD continued

and is specifically tailored for multilayer structures. The unit cell definition can have arbitrary geometry and, since the RCWA method is based in the wavelength domain, the index distribution can consist of both standard dielectric materials and dispersive or lossy materials such as metals. The input or incident plane wave can have arbitrary direction and polarization. Various simulation results can be output including, but not limited to, diffraction efficiency, each vectorial field component, and both near and far fields.

As the latest addition to RSoft's component-level design suite, which also includes *BeamPROP*™, *FullWAVE*™, *BandSOLVE*™, *GratingMOD*™ and *LaserMOD*™, *DiffractMOD* also shares the same RSoft Photonic CAD Layout interface as the other component tools. The user-friendly CAD interface allows the accurate definition of an arbitrary profile without limitations associated with a piecewise approximation. The design and optimization process can be fully-parameterized allowing for batch simulations which greatly simplifies the Modeling process. A significant advantage of a shared CAD interface is that once designers create and analyze the diffractive structure in *DiffractMOD*, the same design layout can be directly simulated in *FullWAVE* and *BandSOLVE* for other aspects of the same structure - such as time-domain response with the finite-difference time domain method or a band structure analysis with the plane wave expansion method. *DiffractMOD* can also be easily used with *BeamPROP, FullWAVE* and *GratingMOD* for the hybrid simulation of a multiple component module. ■

In Brief

US Government Assists Photonic and Datacom Industry in Funding Projects for Photonics Design Automation Software.

RSoft has been awarded two government contracts in both the device/component and optical communication system areas. The STTR project from the Air Force will fund the development of advanced simulation technologies for next generation photonic crystal chip-scale optical networks, which will include further development of both RSoft's *FullWAVE* and *BandSOLVE* software, as well as other new design tools. Columbia University is the university partner in this STTR.

The Navy has awarded RSoft Design Group an option to a previous SBIR Phase II to further the development of multimode fiber systems simulation. The successful implementation of Phase I and Phase II resulted in the development of *ModeSYS*, which is commercially available.

International Representation of RSoft Design Group

RSoft is rapidly expanding internationally into new regions such as south Asia and Latin America. If you represent an international company that focuses on distribution of engineering software, we would like to talk to you! Please stop by to speak with Dr. Zhengyu Huang, VP Sales and Business Development for further information.

Stress Balls

Want to release stress? You can do this by using our design tools, or you can obtain a free Stress Ball at the RSoft Design Group OFC Booth (#2029) Please stop by to insure that you obtain one before the OFC exhibition is over.

Papers using RSoft Design Group Software

RSoft Design Group has developed a collection of technical papers authored by both our technical staff and our customers which describe many areas of design applications. Please go to our website www.rsoftdesign.com to access these references. If you would like to submit a paper to be listed on our site, please e-mail info@rsoftdesign.com.

ATS in Turino Italy has referenced its use of *OptSim* in a talk at OFC 2004, entitled "A Novel Model of Cross Phase Modulation in WDM" by A. Carena, P. Cobetto Ghiggia, and V. Curri.

RSoft Training Seminars

Visit www.rsoftdesign.com/training for the latest details on our training seminars around the country. Can't find a convenient location or time? We'll come to you. E-mail us at info@rsoftdesign.com for information on setting up RSoft training seminars in your office, or even online.

In Booth Workshops at OFC

During the exhibit hours at OFC, RSoft Design Group offers tutorials on recent Photonic Device, System and Network planning applications. Find out the latest design implementation of Photonic Bandgap Crystals, Diffractive Gratings, VSCELs, Multimode Fiber, Metro network planning technologies and more!

The following is a list of times for the applications workshops:

Application	Software Tool	Time	Duration	Where
VCSEL Design	*LaserMOD*	Tuesday, 11:30AM	1 hour	Booth #2029
PBG Design	*FullWAVE* *BandSOLVE*	Tuesday, 3:30AM	1 hour	Booth #2029
Next Generation Optical Communication System Design Software	*OptSim*	Wed., 11:30AM	1 hour	Booth #2029
Diffractive Grating Design	*DiffractMOD*	Wed., 1:30PM	1 hour	Booth #2029
Metro Network Planning	*MetroWAND*	Wed., 3:30PM	1 hour	Booth #2029
Multimode Fiber Modeling	*ModeSYS*	Thurs., 11:30AM	1 hour	Booth #2029

Product Showcases

Don't miss our OFC exhibitor showcases from the experts at RSoft Design Group:

Title: Design Automation software for Optoelectronic components
RSoft Design Group, Inc. - Dr. Zhengyu Huang
Time: Tuesday, February 24, 2:00PM, Location TBD
Design Automation software is critical for simulation and optimization of current- and next-generation optoelectronic devices. First, new developments in RSoft design tools for photonic crystal related applications are presented. Next, our design tool for semiconductor lasers, including new VCSEL capabilities, will be introduced. Finally, a new surface diffraction simulator will be previewed.

Title: Software Solutions for the Simulation of Optical Communication Systems
RSoft Design Group, Inc. - Dr. Brent K. Whitlock
Time: Tuesday, February 24, 3:00PM, Location TBD
Presenting the latest tools for designing optical transmission systems.
OptSim 4.0 introduces a new merged platform combining RSoft's time-domain (*OptSim*), frequency-domain (*LinkSIM*), and wavelength-domain (*LambdaSIM*) simulation technologies into a powerful new GUI. The SPICE interface is ideal for mixing optical simulation with electronic circuit design. *ModeSYS* is the first and only tool for simulating multimode optical links including both spatial and temporal effects.

RSOFT
Design Group
Full Spectrum Photonic and Network Design Automation

200 Executive Boulevard
Ossining, NY 10562 USA

Phone: 914.923.2164
Email: info@rsoftdesign.com
Web: www.rsoftdesign.com