

Spectral Domain — A Revolutionary New Technology

Carl Zeiss Meditec unveils new Cirrus HD-OCT system, the newest member of their Retinal Imaging Family

Carl Zeiss Meditec unveiled Cirrus™ HD-OCT, its new high definition spectral domain retinal OCT system, at the November 2006 American Academy of Ophthalmology meeting in Las Vegas. VISIONS interviewed Chris Ritter, Director of Marketing, Carl Zeiss Meditec, Inc., on the company's plans for bringing this emerging technology to market.



V: What is spectral domain OCT?

CR: Spectral domain OCT is a variant of the Stratus OCT technology pioneered and developed since 1994 by Carl Zeiss Meditec scientists in collaboration with our clinical development partners. Spectral domain OCT creates higher-speed, higher resolution scans of the retina compared to the Stratus OCT. With increased speed, many more scans can be acquired to create three-dimensional images of retinal structures. These data cubes can be precisely registered with each other and with the fundus images. The clinician can view individual B-scans from the cube, or view all the slices together in an animated, "fly-through" sequence.

V: What is Carl Zeiss Meditec's approach to the development of spectral domain OCT technology?

CR: Carl Zeiss Meditec engineers and physicists, working with practitioners and clinical scientists, have given us Cirrus HD-OCT, an exquisitely designed spectral domain platform that is optimized for superb image quality and clinical ease of use. The system is extremely fast, is amazingly simple to operate, and has a small footprint.

However, our ten years of experience building OCTs tells us that doctors need solutions, not technologies. Thus, we are now putting Cirrus systems into the hands of a large team of internationally-recognized clinical experts. Their job is to define how Cirrus HD-OCT images and measurements can best be incorporated into clinical practice. These experts are validating the algorithms that identify the retinal layers, proving the reproducibility of the measurements, comparing the results to the known standard, Stratus OCT, collecting normative data and creating clinical criteria for interpreting the reports.

V: Is the Cirrus HD-OCT a replacement for Stratus OCT?

CR: No — Cirrus HD-OCT is the newest member of the ZEISS family of retinal imaging products. Stratus OCT is the proven standard in OCT imaging and Carl Zeiss Meditec is continuing to develop applications for the Stratus OCT platform. The next software release for Stratus OCT (Version 5.0) includes drawing tools for on-screen refinement of automated retinal thickness maps. Also in the 5.0 release is the Advanced Serial Analysis, which will help identify and quantify glaucomatous progression.

Carl Zeiss Meditec will offer Stratus OCT, GDx and Cirrus HD-OCT as an OCT retinal imaging product line serving a broad spectrum of diagnostic needs. Doctors will be able to view data from both OCT platforms on a common interface, thus allowing the systems to work side by side in the same clinic.

V: How are Cirrus HD-OCT images different from Stratus OCT images?

CR: While Cirrus HD-OCT images are not qualitatively different from standard OCT, they do have approximately twice the axial resolution and are scanned in 1/75th of the time. Improved resolution allows us to see vitreo-retinal features in greater detail. Higher scanning speed can be used to either shorten examination time or to significantly increase the extent and detail of the retinal images.

V: What challenges might clinicians anticipate when switching over to spectral OCT systems?

CR: Spectral domain systems create large data sets that take time to reconstruct into an image and to move from place to place. Three-dimensional images are best viewed on screen and many practices do not have monitors in every consultation area.

Additional networking infrastructure for data storage may also be needed to accommodate the large data cubes. It also will be some time before spectral OCT software, clinical documentation, and data archiving applications catch up with the more mature Stratus system.



V: Who is best served by Cirrus HD-OCT today?

CR: Today's spectral domain systems are best suited to two groups:

1) Researchers who wish to study the meaning of the new data sets and to understand the value the information brings to clinical decision making, and 2) Retinal specialists who can immediately use Cirrus' high resolution qualitative images to help with decision making in selected difficult cases.

V: Who is best served by Stratus OCT?

CR: For the present, the vast majority of clinicians will be better served by Stratus OCT — the proven standard in OCT retinal imaging. Stratus OCT is the only OCT retinal imaging product with fully developed supporting tools including:

- Validated scan patterns and normative data for retina and glaucoma applications
- Well-understood metrics for clinical decision making
- Strong company commitment to continue to invest in applications for the platform
- Reference texts, articles, expert users and educational courses to support the clinician
- Extensive staff training materials
- Patient education video and pamphlet
- Worldwide customer care and technical support team to maximize uptime
- More than 6,000 instruments installed worldwide

V: Should clinicians buy Stratus OCT now or wait for Cirrus HD-OCT?

CR: In most busy practices in the U.S. and in other countries, Stratus OCT pays for itself in a matter of months rather than years. If you need a retinal imaging system today, a Stratus OCT system will benefit your patients and your practice immediately and is a sound clinical and financial investment.

V: When will Cirrus HD-OCT be available?

CR: Cirrus HD-OCT received FDA clearance in February. We are planning to launch the system in Fall, 2007 with a suite of clinically relevant software applications for retina and glaucoma and with guidance from clinical experts on how best to apply this exciting new technology to daily patient care decision making.

VISIONS interviewed Dr. Carmen Puliafito, co-inventor of OCT technology for ophthalmic imaging and clinical development partner for Carl Zeiss Meditec.



Carmen A. Puliafito, M.D., MBA
Professor and Chairman,
Bascom Palmer Eye Institute, Miami, Florida

What is the utility of spectral domain high resolution images compared to Stratus OCT images for clinical decision making?

First off, Stratus OCT will remain the mainstay for imaging most of our patients with diabetic retinopathy and macular degeneration. Stratus will also play an important role in the office of the comprehensive ophthalmologist, for instance, in evaluating pre-operative cataract patients with suspected macular disorders. Cirrus has some practical advantages: (1) It is easier for the operator to use (2) A large 6 mm x 6 mm of the area is scanned so relevant pathology is not missed and (3) The quality of the image is superior.

What is the potential benefit of a fully developed spectral domain system for clinical practice?

Here are some of the potential benefits (1) High quality, higher resolution images particularly looking at the outer retina and RPE areas. This will be of particular value in examining patients with retinal degenerations and other uncommon macular disorders. (2) The development of quantitative indices for retinal volume that will make following retinal pharmacotherapy patients easier.

What are the research questions that need to be answered to make spectral domain imaging a daily clinical tool?

The advanced software for volumetric measurement and 3D imaging will need to be validated.

How will the ZEISS Cirrus HD-OCT realize the full potential of the spectral domain technology?

Cirrus is a very robust platform. It will be back compatible with Stratus. It will have a unique capability for glaucoma analysis. And the software will include specialized retinal analysis algorithms developed at Bascom Palmer.