Widefield OCT: Extending Structural Imaging into the Periphery

These new tools are improving our view.

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Widefield OCT (WF-OCT) and wide-coverage OCT extend our structural and vascular assessment well beyond the central 30° to 50° field of conventional OCT, addressing a critical need when diagnosing and monitoring diseases where peripheral pathology drives clinical decision making.

Enabled by swept-source architectures (~1,050 nm), high A-scan rates, optimized beam optics, eye tracking, motion correction, and montaging algorithms, these systems deliver expanded scan areas with deep penetration and high signal-to-noise ratios. WF-OCT angiography (OCTA) further permits noninvasive visualization of peripheral nonperfusion and microvascular remodeling.

Clinically, WF-OCT supports detection and monitoring of diabetic retinopathy, retinal vein occlusions, uveitis, peripheral vitreoretinal interface disorders, and peripheral degeneration by directly visualizing retinal thickness profiles, tractional changes, breaks, and neovascular complexes across a broader anatomical region.

Current WF-OCT systems include the following (Table):

Optos Silverstone RGB. This tool combines approximately 200° ultra-widefield scanning laser ophthalmoscopy with guided swept-source OCT for targeted peripheral B-scans.

Canon Xephilio OCT-S1. This device offers wide single-capture swept-source scans up to approximately 23 mm with high speed and AI-assisted OCTA.

Intalight DREAM OCT. This device was granted a CE mark in Europe with FDA approval pending. Along with the emerging TowardPi platforms, it provides very high-speed swept-source and broad scan fields.

Additional wide-coverage approaches include the Optos MonacoPro with integrated spectral-domain OCT and ultra-WF imaging, the Heidelberg Spectralis + WF imaging module and ultra-WF OCTA module, and multimodal platforms such as the Nidek Mirante scanning laser ophthalmoscope/OCT that combines ultra-WF fundus capture with wide area OCT/OCTA.

IMAGING WHERE YOU NEED IT

These platforms enhance our ability to image the retina, allowing better diagnosis and monitoring of conditions with peripheral changes. As innovation in this area continues, we look forward to even faster devices with higher resolution, increased automation, and more detailed analytics. ■

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TABLE. CURRENTLY AVAILABLE WIDEFIELD AND ULTRA-WIDEFIELD OCT PLATFORMS

System	Widefield Approach	OCT Details	Speed (A-Scan Rate)	Max Single-Capture Width/Angle (Claimed[1-9])	Montage/Expanded Coverage	OCTA	Practical Strengths
Optos Silverstone RGB[1]	True color cSLO UWF (optomap) + guided OCT to periphery	Guided SS-OCT, 1,050 nm wavelength, < 7 µm and < 20 µm integrated with 200° optomap imaging	Up to 100k A-scans/sec	200° single-shot optomap; OCT guided to peripheral lesions	Peripheral targeting via UWF guidance	Not yet available	Best "see-periphery-then-scan-it" workflow via UWF guidance
Optos MonacoPro[2]	UWF cSLO pseudocolor fundus image + integrated OCT	SD-OCT (integrated), 840 nm, < 7 µm and < 20 µm	Up to 70k A-scans/sec	200° optomap imaging; OCT described as ~40° views	Not primarily montage-based	Not highlighted as core feature	Integrated UWF + OCT for macula/ONH/peripheral targeting
Canon Xephilio OCT-S1[3]	True wide single-capture OCT (large scan geometry)	SS-OCT, 1,060 nm, 8 µm and 30 µm	100k A-scans/sec	Up to 23 mm single scan (~80°)	Wide coverage without montage for posterior/midperipheral view	Yes	Excellent "big single scan" structural + OCTA workflow
Intalight DREAM OCT[4,5]	Ultra-wide single-scan OCT/OCTA + auto montage	SS-OCT, 1,050 nm, 3.8 µm and 10 µm	Up to 400k A-scans/sec	26 mm × 21 mm single scan (~130°)	Auto montage to ~200°	Yes	Very large structural/OCTA capture; montage toward more panretinal coverage
TowardPi BMizar (BM-400K)[6]	UWF full-range SS-OCT/OCTA	SS-OCT, 1,060 nm, ≤ 6 µm and 10 µm "full-range" UWF SS-OCTA positioning	400k A-scans/sec	120° UWF full-range SS-OCTA in ~7 to 15 sec	Large areas via montage	Yes	Designed for very wide OCTA + fast acquisition
Heidelberg Spectralis + Widefield Imaging Module[7]	cSLO widefield fundus + OCT (module-based)	Module expands OCT + fundus modalities	Not specified	55° FOV for fundus imaging and OCT	Panning/steering and multimodal capture; can extend region with technique-dependent mosaics	Depends on system configuration	High-quality multimodal imaging with a defined 55° OCT-enabled widefield module
Heidelberg Spectralis + UWF Angiography Module[8]	cSLO UWF angiography optics (module-based)	UWF angiography module	Not specified	102°	Can be combined with technique-dependent mosaics for peripheral documentation	Yes; OCT depends on configuration/workflow	Strong for wide OCTA; WF-OCT is best represented by the 55° module
Nidek Mirante SLO/OCT[9]	UWF cSLO + integrated OCT workflow	Multimodal SLO/SD-OCT platform, 880 nm, 7 µm and 20 µm (widefield adapter)	Up to 85k A-scans/sec	Up to 163° UWF SLO with widefield adapter	Widefield is primarily via SLO FOV; OCT coverage described as part of SLO/OCT combo	Depends on configuration	Strong multimodal UWF SLO context with integrated OCT capability

Abbreviations: cSLO, confocal scanning laser ophthalmoscopy; FOV, field of view; OCTA, OCT angiography; ONH, optic nerve head; SD-OCT, spectral-domain OCT; SS-OCT, swept-source OCT; UWF, ultra-widefield.

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- Financial disclosure: Consultant (4DMT, Abbvie, Alexion, Alnylam Pharmaceuticals, Amgen, Apellis, Astellas, Bayer, Biogen, Boehringer Ingelheim, Carl Zeiss Meditec, Catalyst, Genentech/Roche, Heidelberg Engineering, Hoffman La Roche, iCare, Janssen, Nanoscope, Notal Vision, Novartis, Optos, Oxurion/Thrombogenics, Oyster Point, Regeneron, Samsung Bioepis, Topcon); Recipient (Heidelberg Engineering, Nidek, Novartis, Topcon); Financial Support (Carl Zeiss Meditec, Heidelberg Engineering, iCare, Intalight, Nidek, Optos, Topcon)