OCT FOR NON-DESTRUCTIVE TESTING (NDT)

Nanophotonic Spectroscopy

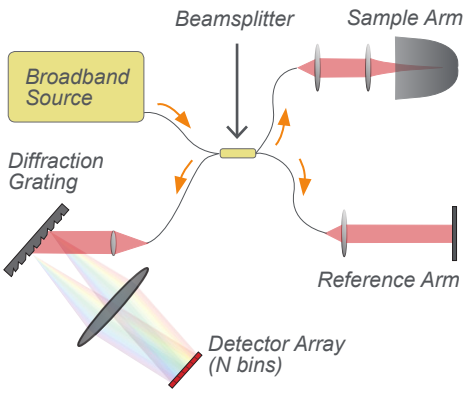
- Small footprint
- Low cost
- From requirements to full prototype in weeks, not months
- No moving parts
- Wafer-based

Optical Coherence Tomography: Unlocking the potential for NDT

Tornado Spectral has developed OCTANE, a line of nanophotonic spectrometers for OCT applications. These optical instruments meet industry specifications for commercial OCT spectrometers and use integrated optics instead of free-space components as their optical core. Experience superior optical performance with a customizable, commercial solution for non-destructive testing.

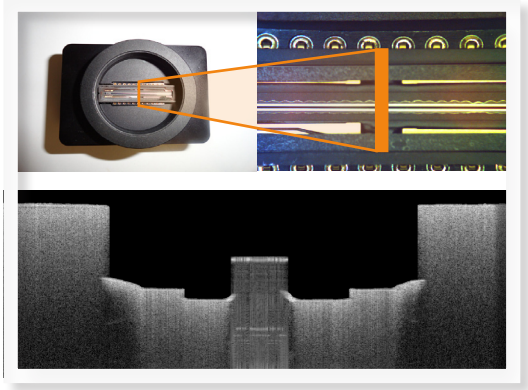
Operating Principles

OCT works similarly to ultrasound but using light instead of sound waves. Light is scanned across the sample or object under investigation. The light that is reflected back is processed and transformed to create a depth profile of up to several mm. The imaging depth is dependent on the optical properties of the sample and the configuration of the OCT device. Image resolution is also determined by the OCT device configuration, with micron level axial and transverse resolution achievable.

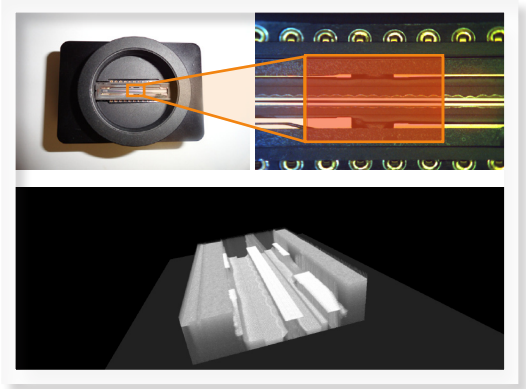


SD-OCT system schematic

Example OCT Scans



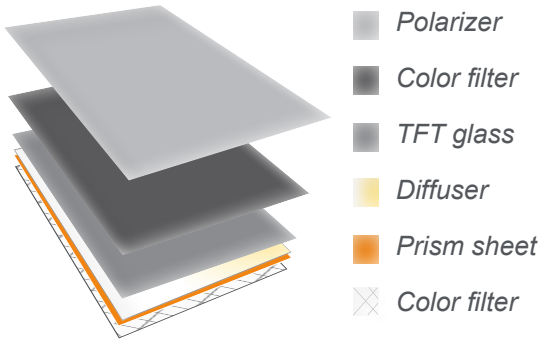
Single OCT image scan with cross-section detail of CCD.



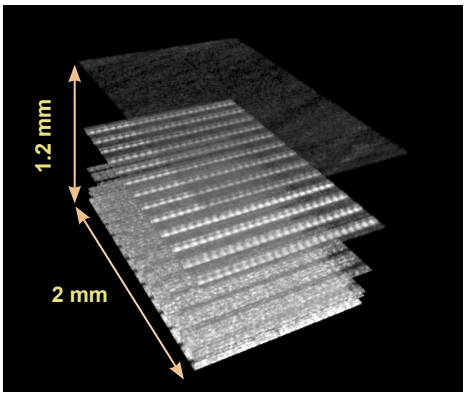
3D OCT image reconstruction of designated scan area from CCD.

Tornado's OCTANE technology enables the potential of OCT for non-destructive testing by overcoming freespace limitations using nanophotonics. OCT is well-suited to NDT due to its fast, accurate, andminimal scan time.

Example: OCT for flat screen imaging



Individual layers for smartphone LCDs



3D OCT image of smartphone display (1.2 mm penetration depth)

Optical coherence tomography is an effective way to perform nondestructive inspection of liquid crystal displays (LCDs) for defects. Confining limitations including cost effectiveness, size, operator safety and delayed results are eliminated with on-chip OCT. This non-destructive method is applicable for flat panel or flexible displays.

Conventional OCT Challenges

- High-cost, low-volume: OCT systems need expensive optical components that require precise alignment
- Large device footprint is challenging to integrate with inline quality and control systems
- Instruments are sensitive to vibration and temperature variation
- Need for repeated calibration

Tornado's OCTANE Technology

- Early detection of defects and non-conforming measurements
- Nanoscale photonics structures that never go out of alignment
- Contact-free, non-invasive and non-destructive operation
- Real-time 2D and 3D images in situ for immediate results
- Micron-level axial and transverse resolution
- Imaging depth of up to several mm

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