

NEW DEVELOPMENTS & ADVANCES

Winter 2013

- Introducing the TURBO/MPx™
 - An intensified CMOS camera built for the ultimate in sensitivity and speed
 - ◆ Full 1.3 MPxel resolution at **500 fps**
 - ◆ Higher frame rates with ROI readout: e.g., **512 by 512 @ 2000 fps**
 - ◆ GaAsP photocathode for 45-50% QE across the visible spectrum
 - ◆ High sensitivity 1.3Megapixel CMOS sensor fiber optically coupled to the intensifier
 - ◆ Gray scale and/or single photon counting at all frame rates
 - ◆ Available in the -Z cooled cathode configuration for zero dark counts
 - Four times the resolution and 10-15 times the speed, full frame, relative to EMCCD products
 - Low light detection equal to or better than EMCCDs
 - -Z option: the lowest dark count/limit of detection imaging capability of ANY camera product on the market†

RAISE THE BAR - consider taking a look at the TURBO/MPx™ for:

- ◆ Fast Calcium-Aequorin GFP
- ◆ Super Resolution microscopy
- ◆ Single molecule imaging/detection
- ◆ Live cell imaging
- ◆ High speed motility and behavioral imaging: bright field and/or fluorescence

- Introducing the XDR™ CCD cameras for extended dynamic range imaging
 - For fast Calcium & Voltage Sensitive Dyes at high speeds
 - Low read noise/high signal-to-noise
 - Low light fluorescence to brightfield
 - XDR/0.8 with the SONY ICX429 image sensor
 - ◆ Twice the speed in all binned modes relative to ICX428 based CCD cameras
 - ◆ Binned well capacities in excess of 100,000 e-
 - ◆ 12 bit output (8 and 10 bit selectable)
 - ◆ **376 by 291 pixels at 340 fps (2x2 binning) to 94 by 72 at 780 fps (8x8 binning)**
 - ◆ Lower frame rates via on chip integration control
 - ◆ Cost effective alternative to MiCAM02-HR
 - XDR/1.3 with the SONY ICX414 image sensor
 - ◆ Base resolution of 640 by 480 at 120 fps with binning and/or partial scans above 1000 fps
 - ◆ Binned well capacities in excess of 100,000 e-
 - ◆ 12 bit output (8 and 10 bit selectable)
 - ◆ **96 by 55 pixels (6x6 binned) at 1300 fps**
 - ◆ Lower frame rates via on chip integration control
 - ◆ Lower cost, higher resolution, higher speed alternative to MiCAM02-HR
 - Both cameras fully supported in Piper Control™ software: **single and simultaneous dual capture**

†Buchin, Michel P. "ICCD, EMCCD, and sCMOS compete in low-light imaging." *Laser Focus World* July 2011: 51-56.

(continued)

- **New Hardware:**

- **ONYX™ Black Box System - Next Generation**
 - ◆ Configured for whole animal imaging and environmentally controlled well plates
 - ◆ Filter wheel and in-box x-y-z positioning system
 - ◆ Converts from Macro to Micro visualization – 1:1 & 5X lens adapters with 0.5 N.A., 19 mm WD
- **High-power large area LED illumination**
 - ◆ Uniform field: <1% non-uniformity
 - ◆ Up to 16 colors from one module - UV to nIR

- **Piper Control™ Software:**

- **Microsoft Sockets:** synchronize Piper Control™ to other software (LabView, Matlab etc.)
- **Single Photon Detection** module: sub-pixel localization of single photons or photon clusters
- Real Time ROI measurements including strip chart, tracking, and event detection
- Faster TTL I/O and synchronization with external devices (up to 5,000 fps)
- More peripheral devices:
 - ◆ Automated Microscopes – Nikon, Zeiss
 - ◆ Yokogawa spinning disk confocals
 - ◆ Stages, Z-Drives and Filter wheels – ASI, Ludl, Piezo Jenna, Prior
 - ◆ High brightness LED products
 - ◆ Data Translation I/O modules - more to come

- **New Applications:**

- Calcium-Aequorin-GFP - Single photon level imaging with sub-millisecond resolution
- Low contrast Calcium and VSD's
- Super Resolution microscopy
- CLI-Cerenkov Radiation induced Luminescence
- High speed motility via sCMOS, CMOS, or image intensified camera and Piper Control™ software

- **More Speed & Diversity:**

- CMOS and sCMOS: up to 5.5 Mpixels (sCMOS) and 500 fps (CMOS)
- Full line of Hamamatsu cameras featuring the ORCA-Flash & ImageEM models
- Simultaneous multiple camera capture within one software instance

- **New Facility (12/1/2011):**

- Dedicated imaging lab for on-site proof of concept experiments
- ONYX™ Black Box system for limit of detection imaging, macroview, or microview
- Full spectrum of camera options ranging from -Z cooled cathode ICCDs to 5 Mpixel CCD and sCMOS
- State-of-the-art PC workstations
- Expanded customer service, R&D, and production space

- **Faster, More Comprehensive Customer Service & Support**

- Net-based desktop porting for immediate assessment & diagnosis, demonstrations & instruction
- New export regulations offer “no waiting” license-exempt shipping of SPI technology