Vadzo Imaging Launches Falcon-2020MRS, a 20MP Monochrome USB 3.2 Gen 1 Camera Built on Onsemi AR2020 HyperLux LP

5K UHD Monochrome USB camera with Dynamic ROI, and high NIR sensitivity targets digital pathology, industrial inspection, and surveillance deployments

SEOUL, SEOUL, SOUTH KOREA, May 22, 2026 /EINPresswire.com/ -- Vadzo Imaging today announced the Falcon-2020MRS, a 20MP monochrome USB 3.2 Gen 1 camera built on the Onsemi AR2020 HyperLux LP CMOS sensor. Featuring 5K UHD resolution, Wake-on-Motion for ultra-low-power standby operation, Dynamic ROI for multi-region simultaneous streaming, high NIR quantum efficiency across 640–950 nm, and UVC-compliant plug-and-play operation across Windows, Linux, and Android, the Falcon-2020MRS is purpose-built for digital pathology, industrial metrology, surveillance, and drone-based photogrammetry deployments where high spatial resolution, intelligent power management, and flexible optics are simultaneous requirements

Technical Highlights

20MP 5K UHD Resolution with Monochrome Output: The AR2020 HyperLux LP delivers 20MP resolution in a monochrome output architecture that eliminates the Bayer filter mosaic, maximizing photon capture per pixel and preserving full spatial resolution without color interpolation. This makes the Falcon-2020MRS directly applicable to digital pathology, whole-slide imaging, and precision metrology workflows where color interpolation from a Bayer sensor reduces effective spatial resolution and introduces artefacts at fine structural boundaries.

Dynamic ROI for Multi-Region Simultaneous Streaming: The Falcon-2020MRS supports multiple simultaneous regions of interest, enabling a contextual wide-area view of the scene at reduced bandwidth alongside a high-resolution ROI preserved at full detail. This allows inspection and surveillance systems to monitor a broad field while simultaneously capturing full-resolution data from a defined critical zone, without running two separate camera channels or switching between capture modes.

Wake-on-Motion for Ultra-Low-Power Deployment: The AR2020 HyperLux LP supports Wake-on-Motion, allowing the sensor to operate in an ultra-low-power state and transition to full-performance mode upon motion detection, faster than the time required to capture a single frame. This is directly relevant for battery-operated surveillance systems, body cameras, and drone payloads where idle power consumption determines operational endurance between charges.

NIR Sensitivity Across 640–950 nm: The AR2020 20MP Camera delivers high quantum efficiency across the NIR spectrum from 640 nm to 950 nm, enabling reliable imaging under NIR LED illumination without visible light. This extends the Falcon-2020MRS's operating envelope to covert surveillance, iris biometrics, vein recognition, and fluorescence imaging modalities where a standard visible-band sensor delivers insufficient signal at NIR wavelengths.

Enhanced Dynamic Range: The sensor's dynamic range architecture preserves detail simultaneously in high-brightness and low-illumination regions within the same frame, reducing the need for per-scene illumination adjustment in environments where lighting varies across the field of view, relevant for factory floor inspection under mixed ambient and task lighting, and for outdoor surveillance across daylight and dusk conditions.

Low-Power Architecture: The HyperLux LP power architecture reduces thermal noise that degrades image quality at high gain settings, and eliminates the need for heat sinks in the thermal design. This lowers overall system cost and simplifies integration into compact enclosures and portable platforms where thermal management adds mechanical complexity.

Flexible Optics Across M12, CS, and C Mount: The Falcon-2020MRS accepts M12, CS, and C mount optics, giving system designers full flexibility across field of view, working distance, and optical performance without board changes. C mount compatibility is particularly relevant for microscopy and metrology deployments where high-quality industrial and scientific optical stacks are standardized on C mount interfaces.

VISPA ARC SDK: The VISPA ARC SDK provides programmatic control over Dynamic ROI configuration, exposure control, image flip and orientation, and fail-safe firmware update. APIs are available in C, C++, C#, and Python for integration across desktop systems, embedded processors, and edge AI platforms.

Targeted Application Domains

Digital Pathology and Whole-Slide Microscopy: Whole-slide imaging at 20× and 40× magnification requires pixel density sufficient to resolve nuclear morphology, chromatin structure, and cellular boundaries across a wide field in a single acquisition. Sensors below 20MP cannot meet this requirement without multi-frame stitching workflows that introduce registration errors and extend scan time. The Falcon-2020MRS 20MP monochrome output captures sufficient field area per frame at standard C-mount microscopy magnifications to reduce or eliminate stitching

entirely. Monochrome architecture preserves full spatial resolution per pixel, and NIR sensitivity at 640–950 nm extends utility to fluorescence and multispectral assay modalities where emission wavelengths fall beyond the visible band.

Industrial Inspection and Metrology: High-resolution surface inspection, dimensional measurement, fiducial detection, and barcode reading require cameras that resolve fine detail across wide fields without stitching or multi-pass acquisition. At 20MP 5K UHD, the Falcon-2020MRS captures sufficient spatial detail for sub-pixel dimensional analysis in a single frame across large inspection areas. Dynamic ROI allows simultaneous full-field monitoring and high-resolution capture of a defined defect zone, reducing the need for a second dedicated inspection camera at the measurement station.

Smart Surveillance and ANPR: Night vision, automated number plate recognition, iris identification, and body camera systems require cameras that deliver high spatial resolution under NIR illumination at illumination levels that standard visible-band sensors cannot handle without supplemental visible lighting. The Falcon-2020MRS NIR Near Infrared camera sensitivity across 640–950 nm enables reliable character and feature capture under 850 nm and 940 nm covert illumination. Wake-on-Motion reduces idle power consumption in battery-operated body camera and remote surveillance deployments where continuous full-power operation is not sustainable.

Robotics, Drones, and Photogrammetry: Drone-based photogrammetry and aerial mapping require cameras that resolve sufficient ground sample distance per frame to produce accurate orthomosaic outputs without excessive overlap. At 20MP, the Falcon-2020MRS captures more ground area per frame than lower-resolution sensors at equivalent altitude, reducing the number of passes required per mapped area and extending mission endurance. Wake-on-Motion and low-power architecture reduce idle draw during transit between waypoints. Compact form factor in 30mm × 30mm and 32mm × 32mm variants integrates directly into UAV payload bays with constrained weight budgets.

Frequently Asked Questions

Why does a 20MP monochrome sensor outperform a color sensor for digital pathology and whole-slide imaging?

Color sensors use a Bayer filter mosaic where each pixel captures only one color channel, red, green, or blue. Spatial resolution is recovered through demosaicing interpolation, which averages neighboring pixels and reduces effective resolution below the sensor's native pixel count. A monochrome sensor has no filter layer, every pixel captures full luminance information, delivering true 20MP spatial resolution without interpolation artefacts. For pathology workflows where nuclear boundary sharpness, chromatin texture, and fine structural detail determine diagnostic accuracy, this per-pixel resolution advantage is operationally significant.

What is Wake-on-Motion, and when does it matter for battery-operated vision deployments?

Wake-on-Motion allows the sensor to remain in an ultra-low-power standby state and transition to full imaging performance upon detecting motion in the scene, in less time than a single frame capture requires. For body cameras, remote surveillance nodes, and drone payloads where the camera spends extended periods monitoring a static scene between events, continuous full-power operation depletes the battery without producing useful data. Wake-on-Motion eliminates this idle power draw, extending operational endurance between charges without requiring external motion detection hardware or software-side polling.

How does NIR sensitivity at 640–950 nm benefit covert surveillance and iris biometric deployments?

Covert surveillance and iris recognition systems use NIR illumination at 850 nm or 940 nm to image subjects without alerting them to active illumination. Standard colour sensors absorb the majority of NIR photons through the Bayer filter mosaic, requiring high-power illuminators to achieve adequate contrast. The Falcon-2020MRS monochrome architecture routes full photon flux at every pixel across the 640–950 nm band directly to the photodiode, delivering reliable image quality at illumination power levels that would be insufficient for a colour sensor of equivalent pixel pitch.

What does Dynamic ROI enable in industrial inspection systems that standard full-frame streaming does not?

Standard full-frame streaming delivers the same resolution and bandwidth for every region of the scene, regardless of whether all regions require the same level of detail. Dynamic ROI allows the Falcon-2020MRS to stream a wide-area contextual view at reduced bandwidth simultaneously with a full-resolution stream from a defined critical zone, a defect-prone surface area, a measurement target, or a barcode read zone. This enables inspection systems to monitor the full conveyor field while maintaining full-resolution capture of the critical inspection region without running a second camera or switching between capture modes mid-cycle.

Availability
The Falcon-2020MRS is available for evaluation and OEM production deployment. Specifications, datasheet downloads, and evaluation unit requests are available at www.vadzoimaging.com. For volume pricing and OEM customization inquiries, contact support@vadzoimaging.com or call +1 817-678-2139.

About Vadzo Imaging

Vadzo Imaging designs and manufactures embedded and machine vision cameras for OEMs and system integrators. The company offers imaging platforms across USB, MIPI, GigE, and SerDes interfaces, with in-house development across sensor selection, optics, ISP tuning, firmware, and

interface stacks, including UVC, Meridian (in-house ONVIF stack), and Vortex (in-house RTSP stack). Vadzo supports edge AI integration and provides OEM customization across hardware, firmware, and software for applications in industrial automation, robotics, smart surveillance, and life sciences.

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