

Vadzo Imaging Introduces HDR MIPI CSI-2 Embedded Cameras Recommended for Drone and UAV Applications

High-resolution MIPI CSI-2 cameras with OIS, Hybrid AF, LI-HDR, and sub-12g form factor for UAVs, onboard vision systems, and payload aerial platforms

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/EINPresswire.com/ -- Vadzo Imaging, a global leader in embedded vision, announces the availability of its [HDR MIPI CSI-2 embedded camera](#) lineup, the Bolt-1335CRO and Bolt-830CRS, now recommended for drone and UAV applications alongside their use in robotics, autonomous mobile systems, and edge AI platforms.



HDR MIPI Embedded cameras for Drones

Powered by the Onsemi AR1335 with Optical Image Stabilization (OIS) and Hybrid Autofocus (Hybrid AF), and the Onsemi HyperLux™ LP AR0830 with LI-HDR and eDR modes, both cameras weigh under 12g and integrate natively with NVIDIA Jetson Orin NX, AGX Orin, Orin Nano, NVIDIA Xavier NX, NXP i.MX8, and Raspberry Pi4/Pi5 via pre-built module-level drivers, delivering the lowest integration friction and lowest end-to-end latency of any interface in Vadzo's UAV camera portfolio.

Highlights:

Both cameras weigh under 12g, engineered for payload-constrained UAVs

Bolt-1335CRO delivers 13MP 4K imaging with hardware OIS and Hybrid AF over MIPI CSI-2

Bolt-830CRS provides 8MP 4K LI-HDR and eDR imaging with Wake-on-Motion and Super Low Power mode

pre-built module-level drivers available for NVIDIA Jetson Orin NX, AGX Orin, Orin Nano, Xavier NX, NXP i.MX8, and Raspberry Pi4/Pi5

Board customization available to integrate with drone and UAV carrier boards for OEM airframe integration

Why MIPI CSI-2 Is the Preferred Interface for Onboard UAV AI Vision

MIPI CSI-2 connects image sensors directly to the SoC ISP pipeline on platforms like NVIDIA Jetson Orin, enabling zero-copy frame delivery from sensor to inference engine without USB stack overhead or network buffering. For autonomous UAVs running obstacle detection, visual odometry, object tracking, or terrain-following AI, this translates directly into a faster, more responsive flight control loop. MIPI CSI-2 also draws significantly less power than GigE while delivering higher bandwidth than USB 2.0. For teams building production-grade onboard vision systems on Jetson Orin or Raspberry Pi 4, MIPI CSI-2 is the correct architectural choice, and the Bolt-1335CRO and Bolt-830CRS are engineered specifically for that integration path.

"The two biggest barriers to deploying [MIPI cameras](#) on UAVs have always been board bring-up complexity and vibration-induced image blur. We address both directly, pre-built module-level drivers for every major Jetson and NXP platform eliminate the device tree and ISP tuning burden, and the Bolt-1335CRO's hardware OIS eliminates motor vibration blur at the optical level. These are not incremental improvements, they remove two fundamental blockers for production MIPI UAV deployments," said Ashu Gupta, Product Manager, Vadzo Imaging.

MIPI CSI-2 in UAV Deployments: Real Challenges and How Vadzo Addresses Them

MIPI CSI-2 delivers the best latency and power efficiency of any camera interface for onboard UAV AI vision. It also presents specific integration challenges that must be addressed for reliable aerial deployment.

Board Bring-Up Complexity : [MIPI CSI-2 camera](#) integration on embedded platforms typically requires manual device tree configuration, V4L2 driver development, and SoC-specific ISP tuning, a process that can take weeks per platform and requires deep embedded Linux expertise. Vadzo provides pre-built module-level drivers for NVIDIA Jetson Orin NX, AGX Orin, Orin Nano, Xavier NX, NXP i.MX8, and Raspberry Pi 4, enabling developers to move from hardware receipt to streaming video on their target platform in days rather than weeks.

Platform Specificity : Unlike USB, MIPI CSI-2 is not universally supported across all embedded hosts, it requires a platform with a physical MIPI CSI-2 receiver and a compatible ISP pipeline. Vadzo's pre-built module-level drivers support covers the most widely used UAV compute platforms - Jetson Orin NX, AGX Orin, Orin Nano, Xavier NX, NXP i.MX8, and Raspberry Pi 4. For custom UAV carrier boards and proprietary airframe compute architectures, Vadzo's board customization program supports camera integration into drone and UAV-specific carrier board designs, including custom flex cable routing, connector repositioning, and board form factor adaptation to match specific airframe mounting constraints.

Short Physical Cable Distance : MIPI CSI-2 operates reliably over short distances. For compact and mid-size UAVs where the compute unit and camera are mounted within the same frame, this is not a practical constraint and is offset by the significant latency and power advantages MIPI provides.

Bolt-1335CRO - Onsemi AR1335 13MP 4K HDR OIS Autofocus MIPI CSI-2 Camera

The Bolt-1335CRO is Vadzo's high resolution color MIPI CSI-2 camera, powered by the Onsemi AR1335 sensor delivering 13MP (4208×3120) 4K color imaging with integrated Optical Image Stabilization (OIS) and Hybrid Autofocus (Hybrid AF). UAV airframes transmit motor and propeller vibration directly to the camera mount at frequencies that cause motion blur regardless of shutter speed, a problem that electronic stabilization cannot fully solve without sacrificing field of view and effective resolution. The Bolt-1335CRO's hardware OIS corrects the optical path mechanically before image capture, preserving the full 13MP resolution and FOV while eliminating vibration-induced blur at the source. Hybrid AF provides fast, accurate subject locking as target distance varies continuously during flight or inspection passes. Supporting 2-lane and 4-lane MIPI CSI-2, it integrates natively with NVIDIA Jetson Orin NX, AGX Orin, Orin Nano, Xavier NX, NXP i.MX8, and Raspberry Pi 4 via Vadzo's pre-built drivers.

Key specs: 13MP 4K (4208×3120) | Onsemi AR1335 | MIPI CSI-2 (2/4-lane) | 9-Axis Optical Image Stabilization and Hybrid Autofocus | Pre-built drivers: Jetson Orin NX, AGX Orin, Orin Nano, Xavier NX, NXP i.MX8, RPi 4

Bolt-830CRS - Onsemi HyperLux™ LP AR0830 8MP HDR MIPI CSI-2 Camera

The Bolt-830CRS is equipped with the Onsemi HyperLux™ LP AR0830 sensor, delivering 8MP (3840×2160) 4K imaging over 2-lane and 4-lane MIPI CSI-2 with LI-HDR and eDR modes for accurate imaging across the full range of outdoor lighting conditions. Wake-on-Motion triggers the camera autonomously on detected scene movement, reducing power consumption during idle hover or stationary monitoring phases without requiring the flight computer to manage camera state. Super Low Power (SLP) mode extends battery range during non-imaging flight segments.

Key specs: 8MP 4K (3840×2160) | Onsemi AR0830 HyperLux™ LP | MIPI CSI-2 (2/4-lane) | LI-HDR + eDR | Wake-on-Motion | Pre-built drivers: Jetson Orin NX, AGX Orin, Orin Nano, Xavier NX, NXP i.MX8, RPi 4

UAV and Drone Applications

Aerial Photography and Precision Inspection - Bolt-1335CRO HDR MIPI CSI-2 Camera

Transmission line surveys, bridge structural inspections, and wind turbine blade analysis require

fine spatial detail resolved clearly at operational flight altitudes. At 13MP with hardware OIS, the Bolt-1335CRO delivers the resolution and vibration compensation to make these details visible without requiring the drone to descend for multiple close passes, directly reducing flight time, battery consumption, and operational risk.

Autonomous Navigation and Obstacle Avoidance - Bolt-830CRS HDR MIPI CSI-2 Camera

Obstacle detection requires ultra-low end-to-end latency from photon capture to flight controller response. The Bolt-830CRS camera's LI-HDR and eDR modes ensure the contrast and depth cues that neural networks rely on for obstacle classification remain valid across the full outdoor lighting range encountered during autonomous flight.

Precision Agriculture and Environmental Monitoring - Bolt-830CRS HDR MIPI CSI-2 Camera

Real-time crop health analysis at UAV altitude requires a camera that feeds AI inference at low latency while the drone moves at speed. The Bolt-830CRS's MIPI CSI-2 interface enables direct delivery to Jetson Orin's inference pipeline for vegetation index computation and field anomaly detection without USB interruption. Wake-on-Motion reduces power consumption between field rows, extending battery range per flight and reducing the number of battery swaps required per survey session.

Photogrammetric Mapping - Bolt-1335CRO HDR MIPI CSI-2 Camera

High-resolution photogrammetric mapping requires consistent, sharp imagery across every overlapping frame in a survey grid. The Bolt-1335CRO's 13MP resolution and OIS deliver the ground sampling distance and frame-to-frame sharpness required for accurate point cloud generation.

Frequently Asked Questions

Q: Are these cameras only for drones? - No. The Bolt-1335CRO and Bolt-830CRS are general-purpose embedded MIPI CSI-2 cameras used across robotics, autonomous mobile systems, medical imaging, industrial inspection, and edge AI applications. UAV and drone deployment is a recommended use case given their Jetson Orin native integration, sub-12g weight, and HDR performance.

Q: MIPI CSI-2 board bring-up is complex. How does Vadzo simplify this? - This is a genuine concern and one Vadzo addresses directly. Vadzo provides pre-built module-level drivers for NVIDIA Jetson Orin NX, AGX Orin, Orin Nano, Xavier NX, NXP i.MX8, and Raspberry Pi 4, enabling developers to move from hardware receipt to streaming video on their target platform without manual device tree configuration or ISP tuning.

Q: What makes hardware OIS different from electronic image stabilization for drone cameras? -

Electronic Image Stabilization (EIS) compensates for motion by cropping and shifting frames digitally in post-processing, which reduces effective field of view and resolution. You lose pixels to gain stability. Hardware OIS in the Bolt-1335CRO corrects the optical path mechanically before the image is captured, preserving the full 13MP resolution and FOV while eliminating vibration blur at the source. For inspection and mapping applications where image sharpness at the pixel level determines whether a defect is visible or missed, hardware OIS is the only reliable solution on a vibrating UAV airframe.

Q: What is the difference between LI-HDR and eDR on the Bolt-830CRS? - LI-HDR (Linear HDR) combines multiple exposures within a single frame readout to extend dynamic range while maintaining natural color rendering. Best for slower-moving or static inspection scenes where maximum dynamic range is the priority. eDR (extended Dynamic Range) uses dual conversion gain in a single exposure, reducing motion artifacts in fast-moving scenes. For autonomous flight and obstacle detection where the platform is moving rapidly, eDR is generally the correct mode. For precision inspection hovering over a structure, LI-HDR delivers maximum dynamic range.

Q: Which NVIDIA Jetson boards are compatible, and what does the evaluation kit include? - Both cameras support NVIDIA Jetson Orin NX, AGX Orin, Orin Nano, and Xavier NX via 2-lane or 4-lane MIPI CSI-2, as well as Raspberry Pi 4 and NXP i.MX8. Evaluation kits include the camera, default M12/S-Mount lens, MIPI CSI-2 cable, pre-built module level driver.

Q: Can these cameras be integrated into custom UAV carrier boards? - Yes. Vadzo's board customization program supports camera integration into drone and UAV-specific carrier board designs, including custom flex cable routing, connector repositioning, and board form factor adaptation to match specific airframe mounting constraints. Contact Vadzo's engineering team at support@vadzoimaging.com to discuss your carrier board specifications and integration requirements.

Availability

The Bolt-1335CRO and Bolt-830CRS are available now for evaluation and production orders. Contact Vadzo at +1 817-678-2139 or www.vadzoimaging.com to request an evaluation kit or discuss customization requirements.

About Vadzo Imaging

Vadzo Imaging is a global leader in embedded vision solutions, providing developers and OEMs with high-performance cameras and imaging platforms for UAVs, robotics, edge AI, industrial automation, and medical devices. Products are optimized for NVIDIA Jetson, Raspberry Pi, Qualcomm RB series, and NXP i.MX platforms. Vadzo supports customers with hardware customization, firmware development, VISPA ARC SDK, and VISPA NXT SDK to accelerate vision product development. Learn more at www.vadzoimaging.com.

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