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High Power LED Fixed-Pattern Projector Works at Long Distances in Bright Backgrounds for Structured Lighting in 3D Machine Vision



Woburn, MA, March 17, 2016 Innovations in Optics, Inc. introduces the Pattern Blazer[®], a high power LED Fixed-Pattern Projector for structured lighting in 3D machine vision. Producing extremely bright patterns at long working distances enables the use of 3D imaging in vast, well-lit areas for applications such as logistics automation in large-scale warehouses, gaging and inspection of sizeable production pieces such as car or airplane body panels, and video identification in long-range CCTV security and surveillance.

In many 3D imaging applications, machine vision engineers are constrained by limitations in the available crop of pattern projectors. Laser based projectors are bright enough to overcome the effects of ambient light pollution, but may have limitations in sharpness and contrast. In addition, laser speckle affects the achievable accuracy. LED based projectors produce sharper lines without speckle, but may be limited by power level or projected brightness. Existing structured lighting products of either type are seldom suitable to cover large areas over a long projection distance.

The Pattern Blazer can be equipped with any LED wavelength. Broadband white and optional narrowband LED colors are available as well as UV and IR wavelengths. Single or multi-wavelength configurations are made possible by the use of chip-on-board LED die arrays. A multi-wavelength unit offers dynamic control of contrast to a machine vision system when objects vary substantially in surface color. UV wavelengths can excite fluorescent materials and IR wavelengths result in a greater transmission of light beyond the surface and into a material.

Other LED Pattern Projectors that claim to be "high power" operate below 13 Watts whereas the Pattern Blazer can operate as high as 150 Watts. In terms of light power, so called "high power" LED Pattern projectors with white LEDs specify a maximum illuminance as high as 220K lux at a 10 cm working distance. The Pattern Blazer using white LEDs can produce 1.5 Mlux as at a working distance of 10 meters. Megalux illumination allows the Pattern Blazer to operate in a daylight ambient background.

Unlike LED Pattern Projectors that use standard C-mount machine vision lenses designed for 2/3" image sensors, the Pattern Blazer utilizes high performance lenses designed for digital SLR cameras that use the larger four-thirds format image sensors. The four-thirds lens standard requires telecentricity in image sensor space to provide commercial cameras with high image quality that anyone can use. The Pattern Blazer LED Pattern Projector applies a four-thirds lens in reverse for object space so that the telecentricity provides exceptional illumination uniformity over the far-field projected pattern.

LED pattern projectors can project fixed-patterns that are not possible with lasers that use cylindrical and Powell lenses, or diffractive optical elements (DOEs). The Pattern Blazer incorporates precision reticles patterned by photolithography which produces thinner lines, sharper edges and more homogeneous illumination than lasers without diffraction or speckle effects. Projected patterns for the Pattern Blazer include lines, grids, circles and random point clouds. Custom patterns can be fabricated upon request.

Innovations in Optics, Inc. (IOI), founded in 1993 and located near Boston, offers high power LED light sources for science and industry that provide maximum photon delivery, illumination uniformity, and stable optical power. IOI products offer system-level advantages over lasers and arc lamps in OEM equipment for many applications. LumiBright™ light engines and illumination systems feature patented and patent-pending optics which collect, direct and maximize output efficiency and uniformity, enabling some of today's most revolutionary solutions in cutting-edge technical applications for LED light sources.