

Application Note

Advanced Electronic Autocollimators for Optical Alignment and Laser Beam Analysis

Accurate angular measurement and optical alignment are critical in modern photonics, aerospace, and industrial manufacturing. Traditional autocollimators, while precise, have been limited in flexibility and measurement range. Duma Optronics has developed a new generation of **electronic autocollimators**, integrating advanced **electro-optics, imaging, and digital signal processing** to deliver **multi-function capabilities** in a compact platform.

Key Features & Proprietary Technology

- Non-contact angular measurement down to sub-arcsecond resolution
- Large dynamic range covering fractions of arcseconds to several degrees
- Multi-tasking instrument: autocollimation, beam profiling, divergence and M² analysis, and micro-alignment in a single unit
- High-speed image processing for real-time measurement and feedback
- Proprietary optical design and signal processing ensures stability and repeatability even under challenging conditions

Applications

- **Optical System Alignment:** Precise centration and tilt measurement of lenses, mirrors, and assemblies; telescope and microscope calibration
- **Laser Beam Characterization:** Pointing stability analysis, beam profiling and divergence measurement across UV–IR systems
- **AR/VR/XR Device Verification:** Alignment of headsets and displays; focus and virtual distance verification
- **Aerospace & Defense:** Gyroscope and inertial unit calibration; optical payload verification
- **Industrial & Mass Production:** Inline verification for assembly; integration into automated testing stations

Advantages over Conventional Autocollimators

- Combines multiple instruments into one compact platform — a Total Station Autocollimator
- Suitable for both precision R&D; labs and mass-production environments
- Faster setup and fewer error sources compared to multi-instrument benches
- Scalable design with interchangeable optics and modular configurations

Conclusion

Duma Optronics' new generation of **electronic autocollimators** transforms the century-old principle of autocollimation into a **multi-functional optical workstation**. By

integrating angular measurement, beam profiling, divergence analysis, and alignment into one platform, the Total Station Autocollimator provides unmatched precision and efficiency — reducing cost, saving space, and enabling applications that were previously impractical.

Contact us to learn how Duma Optronics can optimize your optical alignment and laser diagnostics.