

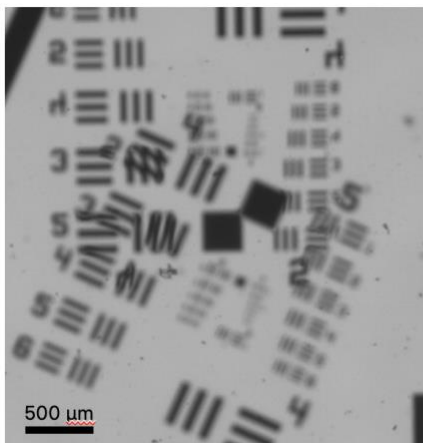
InSPINDLE™: INLINE INSPECTION SYSTEM FOR HIGH-THROUGHPUT IMAGING

InSPINDLE is the SPINDLE® family's industrial inspection module. It is a compact non-contact optical inspection system with integrated DHO Deep Focus™ engineered point spread function (ePSF) technology for inline inspection applications. With depth extension options of up to 6x native depth of field, InSPINDLE instantaneously brings 3D objects into focus without the need to acquire multiple axial images at different focal positions. InSPINDLE enables efficient confirmation of product quality, reducing costs and speeding production.

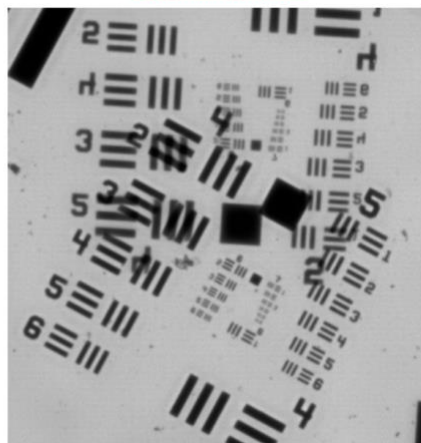
Featuring a **standalone compact form factor, stable phase mask placement and alignment, integration with 3DTRAX® image processing and analysis software, and broad support for objective lens options**, InSPINDLE is compatible with DHO's full library of Deep Focus phase masks, most industrial cameras, and most 2D and 3D motion-control systems. It is suitable for a broad range of high-throughput, single-task inline inspection applications, including **semiconductors, microelectronics, precision optics, and more.**

With no electrical components, no software drivers, and easy hardware installation, InSPINDLE has robust long-term performance with minimal maintenance needs.

CA



InSPINDLE



InSPINDLE for industrial inspection:
InSPINDLE and Deep Focus phase mask attached to 2x/.1 objective lens imaging two US Airforce resolution targets stacked 0.5 mm apart (and rotated). In-focus depth compared with clear aperture (CA) is increased by ~5x with InSPINDLE, enabling both target surfaces to be sharply imaged.



Production line integration:
InSPINDLE can be readily attached to a wide range of inspection cameras and motion control systems. Here, InSPINDLE is connected to an XYZ stage for full movement flexibility.

InSPINDLE is compatible with DHO's full line of Deep Focus phase masks, making it suitable for a broad array of inline inspection applications that require high-throughput imaging of 3D objects or surfaces.

TECHNICAL SPECIFICATIONS

Phase mask compatibility	All DHO Deep Focus phase masks – up to 6x depth extension
System integration	Compatible with ring, transmitted (backlighting), coaxial (epi), darkfield illumination; c-mount camera systems; motion control systems
Dimensions	60 mm diameter x 270 mm length
Weight	2 kg
Field of view	~15 mm diagonal
Tube lens	200 mm; focal length customizable upon request
Transmission efficiency	>95% from 450-700nm; support for other wavelengths available upon request
Objective lens compatibility	Up to 0.5 NA
Example inspection applications	Semiconductors Microelectronics Optical components Textured surfaces
Software	3DTRAX [®] - GPU-accelerated Deep Focus deconvolution (optional)