

# **Panoramic system for visual inspection of inner chambers**

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Remote visual inspection is a mandatory procedure during the production of railway, aerospace and other equipment. It allows non-destructive testing (NDT) of internal surfaces and hard-to-reach components. Machine vision systems enhance the objectivity of making decisions about the degree of danger of the detected defects and reduce manufacturing cost by excluding some of the destructive tests. Specific features of the hardware (design complexity, extreme working conditions, specific materials, etc.) substantially complicate the use of commercially available visual inspection systems and require their modification and adaptation. For example, visual inspection of the combustion chambers is still not fully automated and requires highly qualified NDT specialists. Despite the axisymmetric shape and sufficient space, the large dimensions and high quality requirements for the inner chambers significantly hampers the application of existing video endoscopic and machine vision equipment. In this paper, we report on the machine vision system, which allows panoramic high-quality imaging of inner axisymmetric parts. It includes a ring LED illumination and a mirror-lens optical image acquisition system. The developed device has unique capabilities: absence of mechanical scanning, remote and precise control of focus, zoom, iris and camera setting via a single GigE interface. A prototype of this system was successfully tested.