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(54) **MEDICAL IMAGING, DIAGNOSIS, AND THERAPY USING A SCANNING SINGLE OPTICAL FIBER SYSTEM**

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(57) **ABSTRACT**

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An integrated endoscopic image acquisition and therapeutic delivery system for use in minimally invasive medical procedures (MIMPs). The system uses directed and scanned optical illumination provided by a scanning optical fiber or light waveguide that is driven by a piezoelectric or other electromechanical actuator included at a distal end of an integrated imaging and diagnostic/therapeutic instrument. The directed illumination provides high resolution imaging, at a wide field of view (FOV), and in full color that matches or excels the images produced by conventional flexible endoscopes. When using scanned optical illumination, the size and number of the photon detectors do not limit the resolution and number of pixels of the resulting image. Additional features include enhancement of topographical features, stereoscopic viewing, and accurate measurement of feature sizes of a region of interest in a patient's body that facilitate providing diagnosis, monitoring, and/or therapy with the instrument.

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