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Active imaging systems, that is, systems that employ a laser illumination source, are becoming more prevalent. Control of the illumination source enables a wide variety of potential benefits. It allows one to structure the illumination pattern to derive information of interest. The polarization and spectral properties of the source can be controlled to measure these properties of the object under illumination. Furthermore, pulsed control of the source can enable range-gated imaging, allowing undesired scatter from intervening obscurants to be ignored. Papers in this special section address all of these areas. In addition, these papers highlight the integrated nature of active imaging systems. They illustrate the interdependence of the transmitter and receiver components, as well as the integral nature of postdetection processing to turn sensed photons into information.

The paper by Laurenzis et al. not only illustrates the benefit of range gating when imaging through turbid media, but also presents a technique to quantitatively evaluate the system performance. A second paper by Laurenzis and several other colleagues continues the investigation of range-gated systems, this time looking at components that enable reduced speckle noise and allow sensing of polarization information.

A paper by de Borniol et al. describes development of advanced focal plane arrays. An interesting capability of the described component is its ability to operate in both an active mode and in a passive (thermal imaging) mode. This illustrates the integrated nature of the components with the overall systems concept.

The final two papers in the special section explore aspects of active systems that exploit structured illumination to perform desired measurements. The paper by Ou et al. investigates a challenging application in an outdoor environment. The paper by Wang et al. looks at a novel processing technique to extract shape from a noisy fringe pattern. Both illustrate the importance of postdetection processing as part of an integrated active imaging system.

In total, the papers span a wide range of activities from innovative science to solid systems engineering, and from components to processing. This diversity bodes well for the future of active imaging systems.

Edward A. Watson was a research advisor for the Multispectral Sensing and Detection Division, Sensors Directorate, Air Force Research Laboratory (AFRL) at the time of preparation of this special section. He has over 30 years service with AFRL and its predecessor organizations. He has recently retired from federal service, but his research interests continue to include laser radar, sensing using speckle statistics, low-light-level imaging, and optical phased array technology. He maintains an affiliation with the University of Dayton as Graduate Faculty, Electro-Optics program. He is a recipient of the Rudolf Kingslake Medal and Prize from SPIE and the W. R. G. Baker Prize from IEEE. He is a Fellow of SPIE and OSA and is also an AFRL Fellow.