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Multichannel FMCW lidar for imaging velocimetry and range finding

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We present a concept of near-infrared FMCW lidar for real-time low-resolution imaging velocimetry and range finding of moving objects. One of the problems this instrument to challenge is the detection of unmanned aerial vehicles in an urban environment. The use of a lidar-based system is either in the detection of the object itself or of the wingtip vortices generated by rotating blades. A significant drawback of typical wind lidar is the long measurement time associated with the need to scan the area of interest, therefore we propose an 8x2 matrix of receivers to reduce the total scan time. The main feature of the instrument is the use of commercially available components, including DFB lasers and single-mode fiber for the optical circuit, which can significantly reduce the cost of the device, as well as development time. Data processing and laser control are handled by the FPGA. The characteristics of the multichannel lidar are estimated based on ongoing testing of the single-channel prototype.

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