



## Deconvolution Analysis of Laser Pulse Profiles from 3-D LADAR Temporal Returns

By Michael D. Walter

Biblioscholar Nov 2012, 2012. Taschenbuch. Book Condition: Neu. 246x189x4 mm. This item is printed on demand - Print on Demand Neuware - This work analyzes two deconvolution techniques: Wiener filtering and an iterative process derived from the Richardson-Lucy algorithm. Measured and simulated data are used for testing both methods. 3-D imaging LADAR systems with rapid frame acquisition may lose range resolution due to the transmitted pulse duration. Because of the tradeoff between the need for sufficient target illumination and obtaining high range resolution, LADAR systems often forfeit range resolution performance to improve the signal-to-noise ratio of the observed signal. This work also utilizes these two deconvolution techniques on a sequence of LADAR return images gathered at a very high sampling rate to improve the system's range resolution. Deconvolving the data amplifies any noise present in the data and decreases the signal-to-noise ratio of the reconstructed return pulse profiles. Based on the presence of photon and speckle noise, the work explores the degrees to which range resolution can be improved for both measured and simulated data. Squared error and variance calculations are used to evaluate the performance of both signal reconstruction algorithms. The work shows that applying the iterative algorithm to...



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