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An overview of Broadband Laser Ranging Architecture and Measurement Considerations[1] EDWARD DAYKIN, BRANDON LA LONE, EDWARD MILLER, National Security Technologies, LLC, PATRICK YOUNK, Los Alamos National Lab, COREY BENNETT, Lawrence Livermore National Lab, JARED CATENACCI, National Security Technologies, LLC, LLNL BLR DEVELOPMENT GROUP COLLABORATION, LANL BLR DEVELOPMENT GROUP COLLABORATION — Broadband Laser Ranging (BLR) is a developmental diagnostic intended to measure the position of rapidly moving surfaces in combination with optical velocimetry. Design and employment of a BLR diagnostic on dynamic experiments requires consideration for both the inherent measurement system tradeoffs as well as architectural choices appropriate to the nature of investigation. The diagnostic uses spectral interferometry to measure distance by mapping femtosecond laser pulses to the time domain via chromatic dispersion within the fiber-optic architecture. The system parameters and governing equations that describe measurement range, resolution, and Doppler sensitivity will be discussed. We will also briefly review the impact of diagnostic architectural choices including: nature of interferometer, Interferometric dispersion matching, optical amplification, integration of optical velocimetry, BLR calibration, and field operability. To summarize we will present the architectural and operational approach currently being pursued by NSTec within an on-going collaboration between NSTec, Lawrence Livermore and Los Alamos National Labs.

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