

## Accurate, High-Speed, Full-Color and Vibration-Resistant 3D Shape Measurement Using Linear LED Devices

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**Abstract:** Several types of accurate and high-speed 3D shape measurement using linear LED devices were developed by author's research group. The linear LED device is a key device to develop them. High-speed phase shift synchronized with camera triggers can be achieved by switching the lighting position of the linear LED. The control signals can be generated easily with a no special micro-computer. A compact projector unit can be produced. Author also proposed a calibration method, named a whole-space tabulation method (WSTM), for an accurate and high-speed shape measurement using multiple reference planes. A handy, full-color and real-time 3D shape measurement unit was developed using them. A quick 3D shape measurement projection mapping system was also developed using them. The measurement result and the evaluation value can be projected onto the measured object just after 3D shape measurement. An accurate and vibration-resistant 3D shape measurement unit was also developed. This method, named a feature quantity type whole-space tabulation method (F-WSTM), makes possible a vibration-resistant 3D shape measurement. Three phase information obtained with three projectors are used to obtain 3D coordinates without any camera parameters. In this talk, these methods and the developed 3D shape measurement units are introduced.

**Keywords:** 3D Shape Measurement; Feature Quantity Type Whole-Space Tabulation Method (F-WSTM); Camera Calibration-Free, Linear LED Devices



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