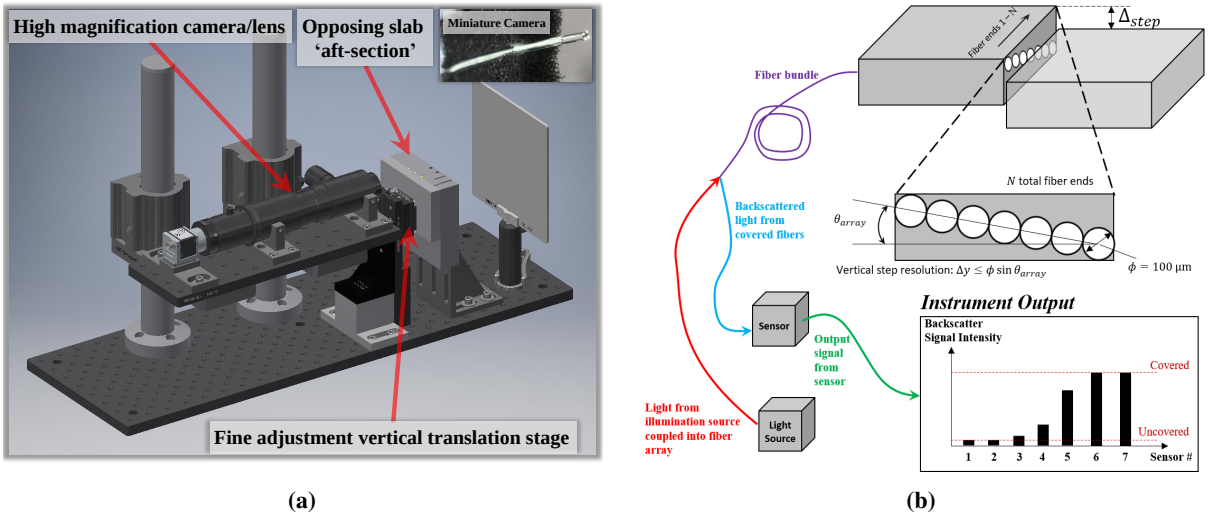
Progress on the Development of a Step Height Sensor for the BOLT Flight Vehicle

Brett F. Bathel*, Joshua M. Weisberger†, Stephen B. Jones‡, and Scott A. Berry§
NASA Langley Research Center, Hampton, VA, 23681

This presentation will summarize progress on the development of a step height sensor for the BOLT flight vehicle. Two methods have been proposed to measure the step size in this effort. The first method involves the application of miniaturized camera embedded in the flight vehicle that views the step through a rearward-facing port (shown in Fig. 1a inset). The second method involves the application of a linear fiber optic array bundle to measure the intensity of light reflected back from the aft body step (concept shown in Fig. 1b). Preliminary testing with the miniaturized camera has been performed in the lab and shows that displacements of ≤ 10 μm can be measured using this method. Final testing with both methods will be performed on the test stand shown in Fig. 1a. This test stand will include a fine adjustment vertical translation stage that will be used to adjust the step height in steps of 1-2 μm. A high-magnification imaging system will also be used to verify the step height. The miniaturized camera and linear fiber optic array bundle will be mounted in one of several port holes with varying degrees of inclination relative to the top surface in the opposing aft-section slab. BOLT flight vehicle details and information on the steps can be found in Ref. [1].



(a) **(b)**

Fig. 1 Proposed experimental setup for BOLT step height measurement with a (a) miniaturized camera and (b) a linear fiber optic array bundle. Details regarding the BOLT flight vehicle can be found in Berry *et al*. [1]

.

References

[1] Berry, S. A., Wheaton, B. M., and Chynoweth, B. C., "Secondary Side Considerations for BOLT Flight Experiment," *AIAA Scitech 2020 Forum*, American Institute of Aeronautics and Astronautics, 2020. https://doi.org/10.2514/6.2020-1559.

*Aerospace Technologist, Advanced Measurements & Data Systems Branch, Mail Stop 493, Senior Member AIAA.
†Aerospace Technologist, Advanced Measurements & Data Systems Branch, Mail Stop 493, Member AIAA.
‡Research Technician, Advanced Measurements & Data Systems Branch, Mail Stop 493.
§Research Engineer, Aerothermodynamics Branch, Mail Stop 408A, Associate Fellow AIAA