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High Precision Motion Control System for the Two-Stage Light Gas Gun at the Dynamic Compression Sector[1] E. ZDANOWICZ, Washington State University, V. GUARINO, Argonne National Laboratory, C. KONRAD, B. WILLIAMS, Washington State University, D. CAPATINA, K. D'AMICO, Argonne National Laboratory, N. ARGANBRIGHT, K. ZIMMERMAN, S. TURNEAURE, Y. M. GUPTA, Washington State University — The Dynamic Compression Sector (DCS) at the Advanced Photon Source (APS), located at Argonne National Laboratory (ANL), has a diverse set of dynamic compression drivers to obtain time resolved x-ray data in single event, dynamic compression experiments. Because the APS x-ray beam direction is fixed, each driver at DCS must have the capability to move through a large range of linear and angular motions with high precision to accommodate a wide variety of scientific needs. Particularly challenging was the design and implementation of the motion control system for the two-stage light gas gun, which rests on a 26' long structure and weighs over 2 tons. The target must be precisely positioned in the x-ray beam while remaining perpendicular to the gun barrel axis to ensure one-dimensional loading of samples. To accommodate these requirements, the entire structure can pivot through 60° of angular motion and move 10's of inches along four independent linear directions with 0.01° and 10μm resolution, respectively. This presentation will provide details of how this system was constructed, how it is controlled, and provide examples of the wide range of x-ray/sample geometries that can be accommodated.

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Paulo Rigg
Washington State University

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