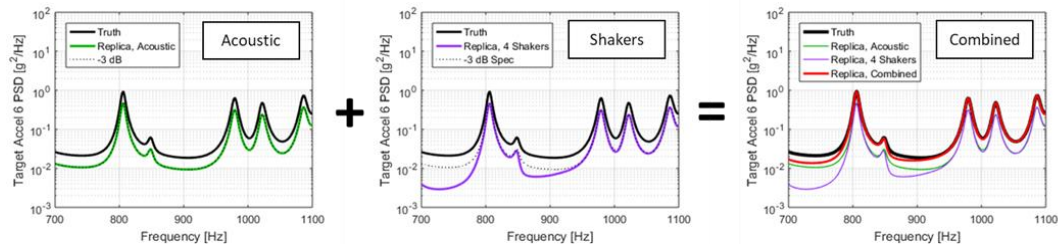
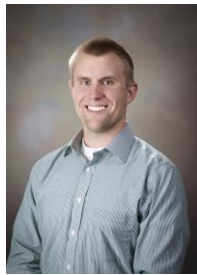
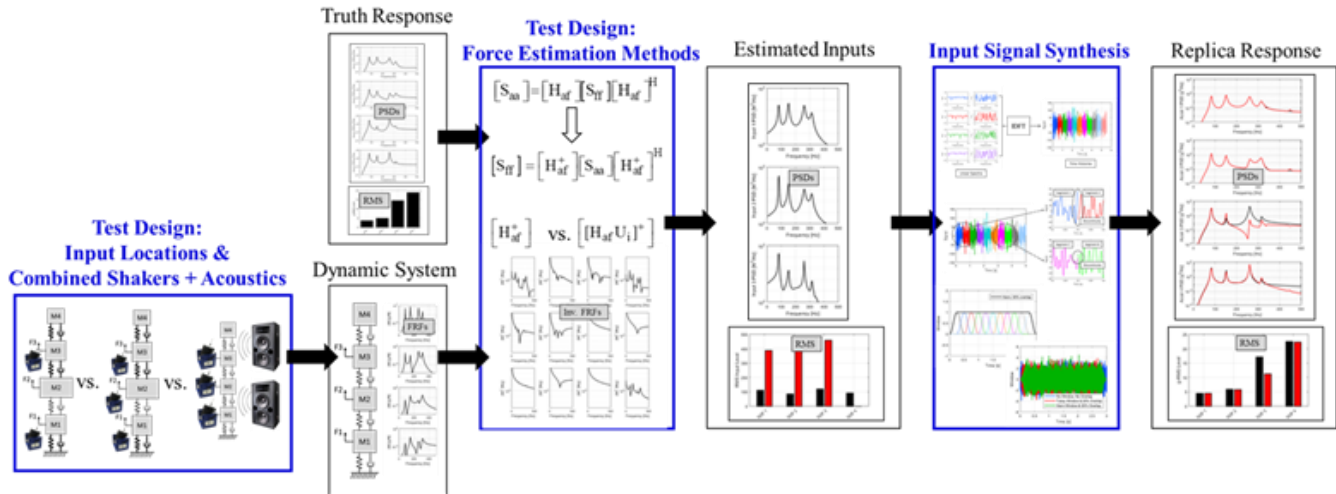


Increasing Efficiency of Multi-Shaker Vibration Tests



Multi-shaker vibration testing, which uses several small modal shakers for excitation, is a promising technique for improving the accuracy of ground vibration tests. Utilizing several small shakers and multiple-input/multiple-output control, this new technique can reproduce the response of structures in complicated field environments such as acoustic or flight environments. Increasing the efficiency of these tests (increasing response level for a given input) is critical to expanding their use for harsher environments. Three methods for increasing efficiency of multi-shaker tests have been developed: modifying the force specification algorithm to implement a shape-constraint on the inputs, combining multiple shakers and acoustic loads, and optimally locating the shakers on the structure.