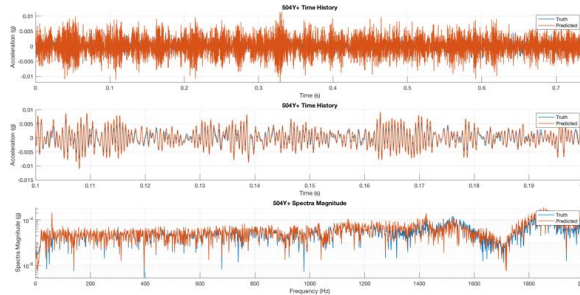
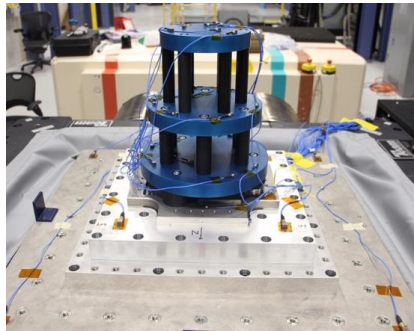


## Field Environment Response Expansion



Qualifying a system to dynamic environments can be broken down into three steps:

1. Understanding the field environment of the system
2. Deriving a laboratory test specification from the field environment
3. Replicating the test specification in the laboratory

The last two steps of the process are irrelevant if the first step cannot be achieved accurately.

The System Equivalent Expansion and Reduction Process (SEREP) has been utilized to expand sparse vibration measurements taken in field environments to all degrees of freedom of a finite element model. This method was tested experimentally on a complex structure that resembles a wedding cake. Predicted responses were compared to actual measurements and found to have a high accuracy for predicting responses at “unmeasured” locations on the structure.