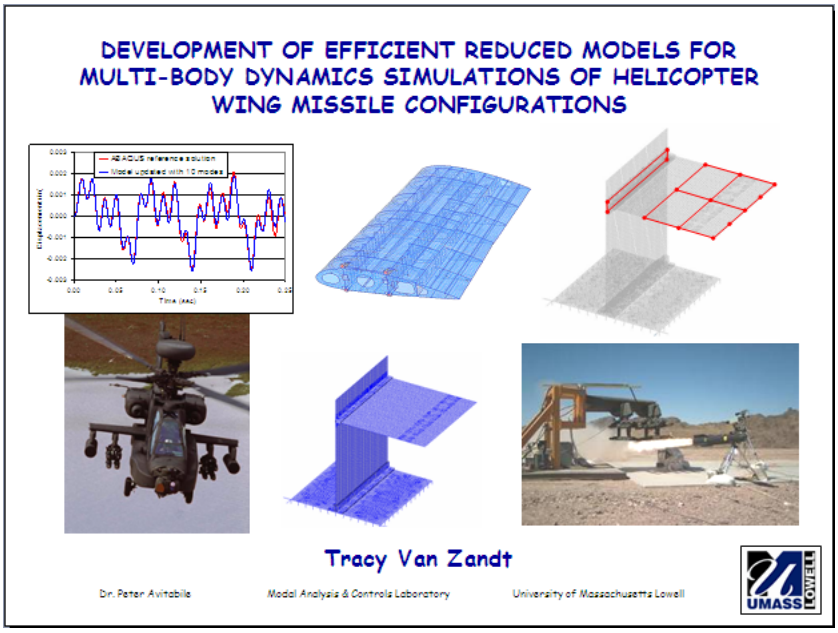
MASTER'S THESIS – TRACY VAN ZANDT

DEVELOPMENT OF EFFICIENT REDUCED MODELS FOR MULTI-BODY DYNAMICS SIMULATIONS OF HELICOPTER WING MISSILE CONFIGURATIONS



Multi-body dynamics simulations often include a representation of the flexibility of some components. This flexibility is defined by finite element models of these components, and these models are typically validated and updated based on experimental modal data. Developing these large finite element models, performing the test, and updating the model can be difficult and time consuming.

An alternate approach is proposed in which experimental modal data are used to update a reduced-order model. Two methods are used. In the first, more traditional method, a detailed finite element model of the complete assembled structure is developed. This model is reduced and then updated based on test data. In the second method, as a departure from the standard approach, only a portion of the structure is modeled. This component model is then updated using data from the complete structure test, and the updated model is able to represent the flexibility of the complete structure.

An example structure which mimics a helicopter, wing and missile configuration is presented to demonstrate the application of the proposed techniques.

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