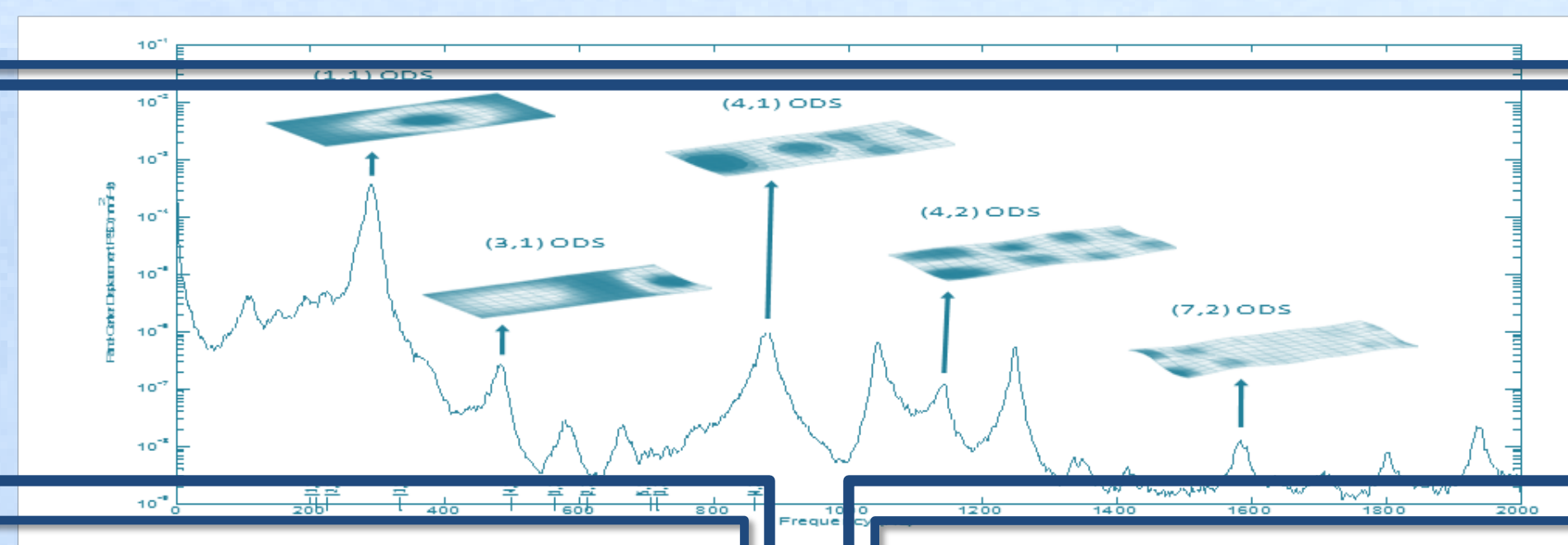


Special Technical Session & Moderated Discussion

Structural Response & Life Prediction for Reusable Hypersonic Platforms



11th International Conference
1-3 July 2013
Pisa
RASD 2013

The RASD Technical Committee is pleased to extend a personal invitation to join us at the upcoming 11th International Conference on Recent Advances in Structural Dynamics (RASD) in Pisa, Italy. A highlight of RASD 2013 will be a special session on aero-structures for reusable hypersonic platforms, followed by a moderated discussion on relevant unsolved technical challenges. Innovative structural dynamics research papers are solicited that integrate multi-discipline, fluid-thermal-structural analysis and experimentation for high-speed, hypersonic flight structures. The goal of the special session and moderated discussion is to bring together the larger technical community, to improve understanding of relevant fluid-thermal-structural interactions, to strengthen U.S. – European technical partnerships, and thus identify potential collaborative research towards the development of response prediction and life assessment methodologies.

Who Should Attend?

- Engineers, Researchers, and Scientists
- Educators and Graduate Students
- Engineering Program Managers and Technical Leaders

Special Technical Session

Tuesday, 2 July 2013

Papers are solicited with an emphasis on high-speed vehicle research in the following technical areas:

- Aero-acoustic loading;
- Coupled fluid-thermal-structure behavior;
- High-cycle/acoustic fatigue;
- Experimental and computational benchmark problems;
- Innovative spatial/temporal modeling schemes to enable long time-record simulation.

Reusable Hypersonic Cruise Vehicle Technologies:

What is Required?

Accurate vehicle to panel-level response and life prediction requires path dependent analysis.

The Hypersonic Challenge...A Structural Dynamics Perspective:

• Significant thermal gradients & transients:

“Hypersonics is the study of flight at speeds where aerodynamic heating dominates the physics of the problem.”

T.A. Heppenheimer, Facing the Heat Barrier, 2007.

• Extreme combined loading at elevated temperatures:

“...for the NASP the loading is aero thermal elastic acoustic and is coincident at the critical design conditions.”

Defense Science Board, 1988.

• Long exposure to high-temperature, oxidizing environment:

“Failure of the [vehicle] panel can occur from acoustic and vibration loads (high-cycle fatigue), from flight cycle thermal and mechanical loads (thermo-mechanical fatigue), or from material deterioration due to excessive temperature (material degradation).”

R.D. Blevins et al., AIAA Journal of Aircraft, 1993.

How has the analysis process changed since the X-20 Dyna-Soar, X-30 NASP and X-33 VentureStar?

“It is difficult to identify the critical design load combination for thermo-mechanical and acoustic loads. The workaround is accomplished by using the worst combinations of loads from different trajectory points.”

Tzong et al., AFRL-RB-WP-TR-2010-3068, VI.

Moderated Discussion

Wednesday, 3 July 2013

A moderated discussion will follow the special technical session, focused on: (1) the most important, unsolved technical challenges from an air-vehicles perspective; (2) the identification of relevant experimental and computational challenge problems; and (3) the areas for potential collaboration.

Abstract Submission Deadline: 28 September 2012

Dr. Michael Spottswood (Stephen.Spottswood@wpafb.af.mil) & Dr. Thomas Eason (Thomas.Eason@wpafb.af.mil)

<https://www.ocs.soton.ac.uk/index.php/rasdconference/RASD2013>