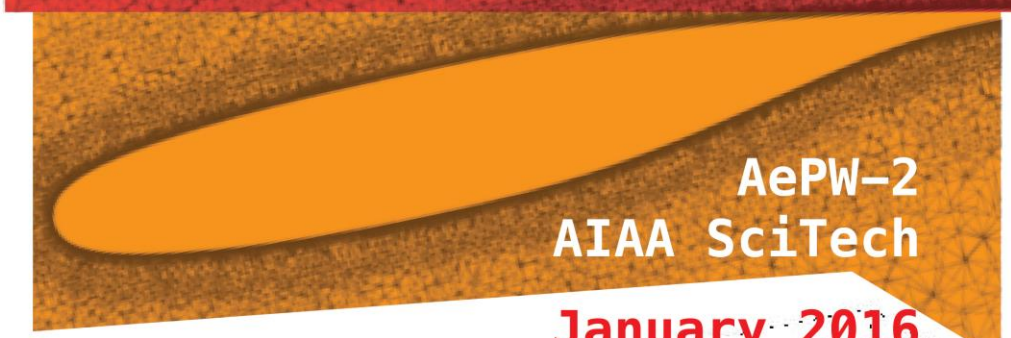
The 2nd AIAA Aeroelastic Prediction Workshop



AePW-2
AIAA SciTech

January 2016
San Diego, CA

Agenda:

- Attached & separated flow cases
- Best practices for unsteady simulation
- Flutter analysis benchmarking
- Benchmark supercritical wing configuration
- Transonic & Subsonic analysis conditions

Sponsored by AIAA Structural Dynamics Technical Committee

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#Unsteady Coupling

Website address:
http://nescacademy.nasa.gov/workshops/AePW2/public/

Telecon agenda, April 2, 2015

- Review March telecon notes
- Review developments since March telecon
- Analysis results, issues that analysts want to discuss
  - Doublet lattice analyses and results (Bimo)
  - URANS flutter analysis animation from FUN3D (Pawel)
- Experimental data (Jen)

- Next telecon May 7, 11 a.m.

March telecon summary

- **Website address: http://nescacademy.nasa.gov/workshops/AePW2/public/**
- Held on March 12, rather than March 5 (with the usual March daylight savings time issues)
- Next telecon April 2, 11 a.m. East Coast time in U.S.
- SU-2 doesn't have existing FSI capability.(Melike and Dave Schuster to talk about this?)
- Block-structured grids from AePW-1 are available, generated by Thorsten Hansen at ANSYS. (Thorsten and Pawel will work together to make those available on the new website.)
- The molecular weight of R-134a isn't the same as a standard property table shows (102 g/mol). The value derived using the listed properties is more like 98 g/mol. This is due to the practical issue of gas purity that is achieved in the wind tunnel. The values on the table are from the test data, where the purity was likely 95%'ish. (Pawel will add a line for molecular weight to the analysis parameters table.)
- Add the following to the table of analyses:
  - ATA Engineering (Eric Blades will run LoPsiChem)
  - AFRL (Rick Graves will run FUN3D)
  - Milano Polytechnico (Sergio Ricci will run numerous codes)
- Please send comments regarding the distributed slides. In particular, are you okay with the abstract submittal form?
- With regard to submitting data to the workshop for comparison:
  - Can you provide results in matlab?
  - How do you feel about providing them in a data structure in matlab?
- Doublet lattice aeroelastic solution results:
  - Bimo and Jen will work to present the results to date at the next telecon
  - We will put the bulk data file, including the aero model and the flutter cards on the web site. This can serve as a basis for those who might want to use correction methods, etc.
- Temporal convergence results
  - Organizations may not have the resources to perform the temporal convergence study for all grids. It is suggested that this be done for a grid resolution where things look to be spatially converged. Experience at NASA has shown qualitatively different results for the unstructured coarse grid than those observed for the finer grid resolutions.
  - The flutter results at low Mach number (Mach 0.74) have shown great variation with regard to time step size. The predicted aeroelasticity stability of the system has been shown to be a function of the time step size and the subiteration convergence level.

Developments since March telecon

- Experimental data added to website
- Several analysis teams responded regarding participation (see matrix on next page)

AePW-2 Analyses/Commitments to date (3/30/201)

Analysis Team	Code	POCs	Email contact
Technion - IIT	EZNSS	Daniella Raveh	daniella@technion.ac.il
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Embraer S.A.	CFD++,ZTRAN , NASTRAN *	Guilherme Ribeiro Begnini	guilherme.benini@embraer.com.br
Politechnico di Milano	Various codes	Sergio Ricci	sergio.ricci@polimi.it
AFRL	FUN3D	Rick Graves	Rick.Graves@us.af.mil
Mississippi State	MAST	Manav Bhatia	Bhatia@ae.msstate.edu

We invite you to participate

Participation is unrestricted

Important Dates

- Kickoff Meeting: SciTech 2015
- Workshop: SciTech 2016
- Computational Results Submitted by Nov 15, 2015
- Computational Team Telecons: 1st Thursday of every calendar month 11 a.m. EST

Updated analysis parameters table (updated on website March 3, 2015)

Parameter	Symbol	Units	OTT Configuration	PAPA Configuration	OTT Configuration
Mach	M		0.7	0.74	0.85
AoA	α	deg	3°	0°	5°
Reynolds number (based on chord)	Re_c		3.418×10^6	4.450×10^6	4.491×10^6
Reynolds number per unit length	Re	Re_c/ft	2.564×10^6	3.338×10^6	3.368×10^6
Dynamic pressure	q	psf	170.965	168.800	204.197
Velocity	V	ft/s	387.332	375.700	468.983
Speed of sound	a	ft/s	553.332	506.330	552.933
Static temperature	T_{stat}	F	85.692	89.250	87.913
Density	ρ	$slug/ft^3$	0.00228	0.002392	0.001857
Ratio of specific heats	γ		1.113	1.136	1.116
Dynamic viscosity	μ	$slug/ft-s$	2.58×10^{-7}	2.69×10^{-7}	2.59×10^{-7}
Prandtl number	Pr		0.683	0.755	0.674
Test medium			R-134a	R-12	R-134a
Total pressure	H	psf	823.17		757.31
Static pressure	p	psf	629.661		512.120
Purity	X	%			95
Sutherland's constant	C	R	438.07	452.13	438.07
Reference viscosity	μ_{ref}	$lb-sec/ft^2$	2.332×10^{-7}	2.330×10^{-7}	2.332×10^{-7}
Reference temperature	T_{ref}	R	491.4	491.4	491.4