

Hover Prediction Workshop (HPW) Meeting Minutes

SciTech Discussion Group Meeting 1/10/2023 6:30-8:00 PM

Minutes

- Bob opened the meeting.
 - The plan is to compile community results for the HVAB rotor.
 - There will be presentations from Tom and Rohit.
- Charles Tinney offered to provide data from a 35% scale EVTOL rotor and is checking for interest.
 - This is an early generation Joby 35% scale rotor, 1M diameter.
 - Currently they are making adjustments to the room and targeting a spring conference paper on aeroacoustics.
 - This is a 5-bladed rotor, but can test 4-bladed, and maybe even 2-3 bladed.
 - They are happy to share data.
 - This is an isolated rotor test, blades are not instrumented.
 - Will provide thrust and torque measurements.
 - This could be a stepping stone into EVTOL participation.
 - Up to 0.5M Reynolds number.
 - Currently no wake measurements, but have a PIV system so may be able to do this.
 - Geometry is available, but needs to be scanned. Joby need to provide permission, but not foreseen as an issue.
 - Not seeing recirculation so far in the acoustics measurements.
- Tom Norman Brief on the HVAB Test:
 - Data acquisition is complete and was presented at the VFS Forum 2023
 - HVAB website <https://rotorcraft.arc.nasa.gov/HVAB/>
 - Initial release of data on the website 9/23 and 11/23
 - There is an overview of the test, measurements, and configurations provided.
 - More data will be added to the website.
 - Initial data includes general information that is important to read first.
 - There are also README files with the data.
 - There is limited thermography data available.
 - Planned updates,
 - Additional thermography data, 1/24.
 - CAD for HVAB blade, ARTS test stand, and 80x120 test section, 2/24.
 - PIV measurements, spring 2024.
 - Additional blade pressures will be reprocessed and added, spring 2024.
 - Questions:
 - Q: Is there Deformation data on the website?
 - A: Yes.
 - Q: Is CAD available on the website?
 - A: Yes.
 - Q: How does one compare to the shadowgraphy data?
 - A: README files have information on these data.

- Q: Is there experimental uncertainty information?
 - A: This is on the website and in the paper.
 - There was a request to keep trip dots present for one case of the thermography data.
 - A: That will be provided.
- Rohit Jain Brief on HVAB CFD Predictions:
 - Plan to put together a paper of community HVAB data.
 - Modeling the structural deformations is important to capture the performance.
 - Tom: RCAS model is originally from Langley with mods by Rohit. There is now a CAMRAD model and we hope to post these to the website.
 - Blades were not identical during the test, the blade pitch is not the same for each blade.
 - Tom: Recommended to use average of pitch measured on the 4 blades.
 - Bob: There is recommended cone and lag data on the HPW website, we need to update these to line up with the test.
 - There was a discussion on the distributed loads.
 - The passage of the vortex under the blade is captured in CFD but not the test.
 - Need to look closer at the data for the reason.
 - The fully-turbulent test data comparison is a blend of tripped (lower thrust) and lower tripped data (higher thrust).
 - There was a discussion on transition and why the images look different from the simulations.
- Bob opened the floor for feedback.
 - No feedback.
- Bob opened the floor for an EVTOL discussion.
 - Andy: Need to support uncertainty in the methods.
 - Bob: Need to get a UQ discussion going.
 - Jay: Variable RPM hover is relevant to the EVTOL problem.
 - Andy: Need a HIGE analysis.
 - Henry: Need rotor/rotor interactions and acoustics.
 - Henry: Also transition from hover to forward flight.
 - TC: Ducted fan hover, especially the gap between the blade and shroud is interesting.
 - Need a dataset.
 - Alex: Hover with ground obstacles.
 - There is a Navy paper that uses open blade geometry on this.
 - Data should be requestable.
- Bob closed the meeting.