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.