

Hover Prediction Workshop (HPW) Virtual Meeting Minutes

AIAA AVIATION Conference 7/27/2021 100-145 PM EST

Attendees

- Nathan Hariharan, HPCMP
- Robert Narducci, Boeing
- Jennifer Abras, HPCMP
- Lakshmi Sankar, GATech
- Brian Wake, LMCO
- Vera Klimchenko, LMCO
- Tom Norman, NASA
- Joe Derlaga, NASA
- Andrew Wissink, Army
- Austin Overmeyer, NASA
- Thomas Fitzgibbon, University of Glasgow
- Phuriwat Anusonti-Inthra, Army
- Jared Carnes, UTK
- David O'Brien, Army
- Juergen Rauleder, GATech
- Rohit Jain, Army
- Kyle Smolarek, Bell

Minutes

- Nathan opened the meeting, discussed this and future meeting at SciTech, easier to attend virtually
- Passed the meeting to Bob to go over the slides
- Bob presented a summary of workshop activities
 - Introduced the steering committee
 - Went over the agenda for the meeting,
 - Charter is to gather from different organizations interested in the hover problem
 - Important to review the charter, keep the goals of the workshop in mind
 - Assess current state of hover, scope the challenges, and act as a catalyst for solutions
 - Website
 - Mentioned the website is searchable, <https://www.aiaa-hpw.org>
 - Past publications are listed
 - Quad Chart
 - Highlighted the future plans for the workshop starting with the isolated rotor and progressing to the grand challenge as the focus of the workshop
 - HPW started with Nathan Hariharan and Alan Egolf in 2011 with input from Lakshmi Sankar
 - Over 100 participants today
 - Multiple aspects to the hover problem, accuracy vs. efficiency
 - Need to understand the sacrifices made to achieve efficiency
 - The grand challenge problem came later to expand on the isolated rotor problem

- Eventually want to look at non-idealized scenarios, that's the real problem
 - Bob described the various focus clouds on the chart
 - Publications show HPW has influenced community outside the workshop
- Bob played the CH53K movie provided by Jim Forsythe
 - 53K is an example of successful application of hover prediction
- Many papers in 2021
 - Transition and wake breakdown were a couple of topic areas
 - FM is sensitive to turbulence and transition models, this was investigated using installed and free air configurations
 - Facility effects make a difference
 - Wake breakdown is still present in many solutions
 - As the technology improved, the improved preservation of the tip vortex led to enhanced secondary structure preservation, but now we have the vortex soup problem where the secondary structures inaccurately overwhelm the wake.
- Recommended Challenges for 2021
 - Blind HVAB test
 - Run with the idea with repeating in the future if the cases don't match test data later
 - Download prediction
 - Airframe has partial ground effect on the rotor and we want to predict the rotor influence on the fuselage
 - Many cases in the public to use for SciTech 2022, may get data on this from NASA in the future
- HVAB rotor specifics
 - Cone and lag angles provided on the website were based on the PSP rotor
 - Rohit updated the cone and lag angles using the updated HVAB properties
 - HVAB has a fairing at the root that isn't shown in the image on the website
- NFAC Facility
 - The test will try to minimize facility effects, but if participants want to model this, the geometry for the facility is on the website
 - One end is closed and one end is open, image in the slides
- Parameters of Interest
 - List of parameters have been provided to make sure the FM is predicted for the right reasons when reporting information
 - Using the list will also make cross comparisons easier
 - Reporting the computational resources would also be beneficial
- Website
 - Bob walked through the website
 - Geometry details are available
 - Parameter normalizations
 - Meeting notes
 - File downloads are also available under the more tab

- Look ahead to 2022
 - Next meeting in San Diego at SciTech 2022 and will also be virtual
 - 2 hover sessions with a variety of papers
- Bob passed the meeting back to Nathan
- Nathan highlighted that Bob is keeping the workshop grounded with his valuable contributions
- SciTech in-person attendance is still under review and may still be held virtually
- File share app downloads don't work for all government systems, try alternate computer
- Tom Norman started his tunnel test discussion
 - Mechanical test stand issues have delayed progress
 - Currently on track to start again in the next week or so
 - Early September is the estimated start and is planned to complete at the end of the calendar year
 - One bonus to the test is the Army wants some download testing with the HVAB rotor
 - Obtained an open fuselage geometry and modifying to get desired measurements
 - Isolated rotor testing first, followed by fuselage installed testing
 - Nathan: is the geometry available?
 - Tom: It will be available, but isn't ready yet.
 - Nathan: maybe we can provide it early for blind computations, but it isn't critical.
 - Tom: Data and geometry is planned to be open and available when it is ready. Priority is to fix the test stand and get the isolated rotor test ready. Delay was good in a way because it gave time to plan the fuselage testing
 - Juergen: What will the configuration look like?
 - Tom: Fuselage is helicopter-like, generic, slender, no tail boom or empennage, no tail rotor. Wings are present, to simulate compound helicopter. Variations on combining the wings and fuselage, and wing span, will be pursued. Optical measurements only planned to have shadowgraph data. No transition or PIV measurements planned.
 - Juergen: This is a bad time for experimentalists, no apologies necessary.
- Nathan: opened the floor for comments
 - No comments were made
 - SciTech deadlines are getting tighter, extensions are harder to obtain, plan for this when completing publications
- Nathan thanked the committee members
- Nathan closed the meeting