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**First Name:** Natasha & Lauren

**Last Name:** Schatzman & Weist

**Organization:** NASA Ames Research Center, Aeromechanics Office

**Job Title/Academic Title:** Aerospace Engineer

**Your Location:** United States

**Are you comfortable presenting your session in English?** Yes

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**Preliminary Title:** RApid Blade and Blade-Vortex InTeraction (RABBIT) GUI implementation via MATLAB Application Designer

**Description (Limit 2000 characters):**

Rotorcraft noise source identification and reduction is crucial to the emergence of the Urban Air Mobility (UAM) market. One key rotor noise source is Blade Vortex Interaction (BVI), caused by the rotor wake interacting with the rotor blades. The low-fidelity RApid Blade and Blade-Vortex InTeraction (RABBIT) tool was created to predict the location and characteristics of Blade-Vortex Interaction (BVI) noise. RABBIT enables engineers to quickly locate and understand designs or configurations that cause significant BVI noise. Furthermore, RABBIT can identify the time and location of blade overlap for coaxial rotors. RABBIT is not a general acoustic prediction tool, but instead utilizes vortex and wake parameters to visualize and predict only BVI noise.

To date, RABBIT has been validated against CAMRAD II and ANOPP2/AARON for three NASA Revolutionary Vertical Lift Technology (RVLT) concept vehicles: the Quiet Single Main Rotor (QSMR), Side-by-Side, and Quadrotor. RABBIT has been shown to be a useful BVI prediction tool capable of visualizing BVI as a function of various parameters. Impulse factor and time rate of change of loading allows for a unique BVI prediction technique that provides information on impulse strength, location, and frequency.

This presentation will highlight how MATLAB’s App Designer was utilized to enable users to navigate RABBIT easily and efficiently without prior experience with MATLAB or rotorcraft acoustics. RABBIT users can build and view rotors in real time with options to control blade chord, radius, phasing, and airfoil geometry. Furthermore, multiple rotors can be combined to create state-of-the-art multi-rotor vehicles or fleets. Editable tables, sliding bars, and push buttons were implemented within MATLAB’s App Designer for RABBIT’s GUI to allow engineers and designers to predict low order acoustic impact of BVI occurrences.

**MathWorks products used:** App Designer

**Speaker Background:** Dr. Natasha Lydia Schatzman graduated from the Georgia Institute of Technology with her B.S. (2011), M.S. (2014), and Ph.D. (2018) from the Daniel Guggenheim School of Aerospace Engineering. She has worked in the Aeromechanics office at NASA Ames Research Center since 2010, where she has further contributed to the field of computational and experimental rotorcraft aeroacoustics. She has led and executed various acoustic tests in the National Full-scale Aerodynamics Complex (NFAC) 40- by 80-Foot Wind Tunnel and Planetary Aeolian Laboratory Wind Tunnel for Mars rotorcraft. Her computational skills include proficient use of the tools CAMRAD II, CHARM, ANOPP2, RotCFD, and OVERFLOW. She is the developer of the program RApid Blade and Blade-Vortex InTeraction (RABBIT) tool. She has personally mentored over 25 undergraduate and graduate students in the Aeromechanics office with a focus on aeroacoustics and professional development and serves a key PI for various Vertical Lift Research Center of Excellence (VLRCOE) university tasks. Dr. Natasha Lydia Schatzman’s passion is to inspire future engineers by sharing her genuine love for learning and innovation.