

Abstract Submitted  
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**Spectral Analysis of the Wake behind a Helicopter Rotor**

**Hub** CHRISTOPHER PETRIN, Oklahoma State Univ, DAVID REICH, SVEN SCHMITZ, Pennsylvania State Univ, BRIAN ELBING, Oklahoma State Univ — A scaled model of a notional helicopter rotor hub was tested in the 48” Garfield Thomas Water Tunnel at the Applied Research Laboratory Penn State. LDV and PIV measurements in the far-wake consistently showed a six-per-revolution flow structure, in addition to stronger two- and four-per-revolution structures. These six-per-revolution structures persisted into the far-field, and have no direct geometric counterpart on the hub model. The current study will examine the Reynolds number dependence of these structures and present higher-order statistics of the turbulence within the wake. In addition, current activity using the EFPL Large Water Tunnel at Oklahoma State University will be presented. This effort uses a more canonical configuration to identify the source for these six-per-revolution structures, which are assumed to be a non-linear interaction between the two- and four-per-revolution structures.

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