Abstract Submitted
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An Experimental Investigation on Drone Propellers Operating Under Icing Conditions[1] ZHE NING, YANG LIU, Iowa State University, HONGWEI MA, BeiHang University, HUI HU, Iowa State University — An experimental study was conducted to investigate the dynamic ice accretion process over the surfaces of typical drone propeller blades and to characterize the detrimental effects of ice accretion on the performance of the Drone propeller in terms of thrust generation and power consumption. The experimental study was conducted in the Icing Research Tunnel of Iowa State University (i.e., ISU-IRT) with a commonly-used, commercially-available Drone propeller exposed in frozen-cold incoming airflow under various icing conditions usually encountered by Drones in winters (i.e., under both rime and glaze icing conditions). In addition to revealing the transient ice accreting process over the surfaces of the rotating propeller blades by using a "phase-locked" imaging technique with a high-resolution imaging system, the dynamic thrust force generated by the Drone propeller was also measured simultaneously along with the required power inputs to drive the Drone propeller during the dynamic ice accreting process. The time-resolved aerodynamic force measurements and power consumption data were correlated with the acquired snapshots of the instantaneous ice accretion images to gain further insight into the underlying icing physics pertinent to Drone icing phenomena. . -/abstract- Zhe Ning, NianHong Han, Hongwei Ma, Hui Hu 1The research work is supported by National Science Foundation under award numbers of OISE1826978, CBET- **1916380** and CMMI-18248400 and Iowa Energy Center of the Sta

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