

# TURBULENCE MEASUREMENTS IN THE WESTERN PASSAGE OF MAINE

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This work presents measurements of turbulence from the Western Passage of Maine, a likely early-market tidal energy site. The measurements were made using ADVs mounted on the moored StableMoor platform. These ADVs are equipped with inertial measurement units, which are used to correct ADV measurements for mooring motion to estimate turbulence statistics that are important to tidal energy device design [1]. These statistics can be used to generate realistic inflow time-series for driving numerical simulations of tidal energy turbines using tools such as TurbSim and FAST [2], [3]. The results presented here demonstrate that the approach produces reliable estimates of turbulence statistics that are important to tidal energy device design.

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## REFERENCES

- [1] L. Kilcher, J. Thomson, J. Talbert, and A. DeKlerk, "Measuring Turbulence from Moored Acoustic Doppler Velocimeters," National Renewable Energy Lab, 62979, 2016.
- [2] B. J. Jonkman, "TurbSim user's guide version 1.50," National Renewable Energy Laboratory, NREL/TP-500-46198, Sep. 2009.
- [3] J. Jonkman, "The new modularization framework for the FAST wind turbine CAE tool," in *51st AIAA Aerospace Sciences Meeting including the New Horizons Forum and Aerospace Exposition*, 2013, p. 202.