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PRESS RELEASE

Turbulence Sensor Network to be Tested During Total Solar Eclipse

DAYTON, OH, March 8, 2024 – MZA Associates Corporation has organized a consortium of research and educational organizations to conduct a series of atmospheric turbulence measurements during the upcoming total solar eclipse. The eclipse will traverse the United States from Texas through the Midwest and on to the far northeast during the afternoon of April 8, 2024. The measurement effort is called the Eclipse Turbulence Evaluation and Sensor Testing or “eTEST,” for short. A number of specialized optical and weather measurement devices placed along the path of the shadow of the eclipse will be coordinated to measure the effect of the eclipse on the local atmospheric turbulence and weather conditions. The eTEST consortium includes MZA along with Joint DoD partners from the Air Force, Army, and Navy research centers and affiliated universities. A number of MZA’s DELTA-Wx turbulence sensors are deployed along the path of totality in the Dayton, Ohio area. Additional sensors are also being installed along the eclipse path with the cooperation of local governments and public schools.

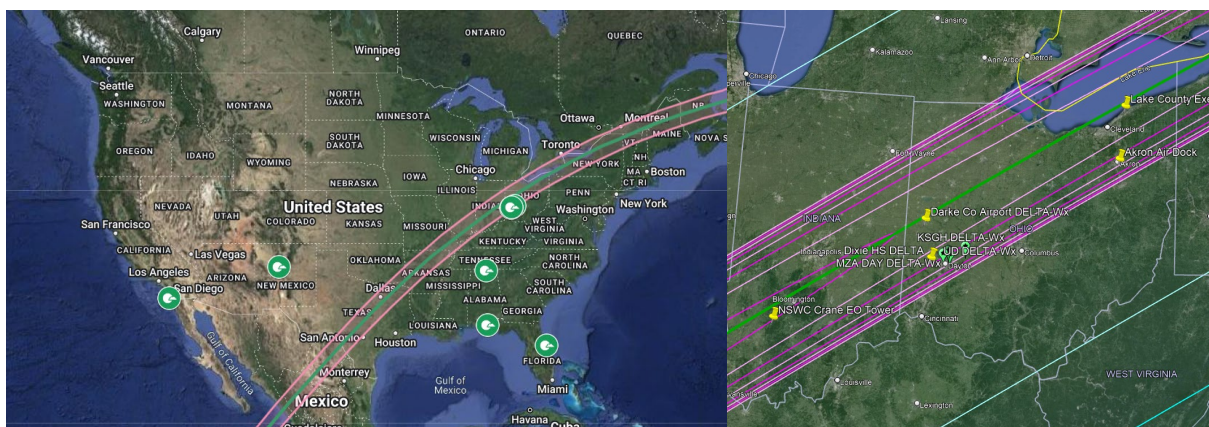
Atmospheric turbulence is of general scientific interest, but it is of particular interest to those who study the propagation of light through the atmosphere. Atmospheric turbulence, which is manifested by pockets of air that have differences in temperature, is what causes the stars to appear to twinkle and mirage effects when looking over a hot surface. For the projection of lasers, the effect of the atmosphere is to significantly blur the beam along the path. For these reasons, researchers that are interested in applications such as power beaming, laser communications, and laser weapons, study the effect of turbulence and weather at various operating locations to determine how well such systems can be made to work.

MZA manufactures a line of atmospheric sensors that characterize turbulence along various optical paths (<https://mass.mza.com/>). The DELTA-Wx Deep-Learning Turbulence Sensor combines turbulence and weather measurements through machine learning, which is used with weather forecast data to predict future propagation conditions. Several of these sensors are installed at consortium locations either directly along the path of the upcoming eclipse, or experiencing a partial eclipse condition. These sensors will make coordinated time-lapsed measurements of the turbulence and standard meteorological measurements—such as temperature, barometric pressure, and wind speed—coordinated with the turbulence data. The data will then be made available to the consortium for further study of this unique and wide-spread eclipse event.

The upcoming eclipse provides a rare opportunity to see how several geographically-separated sensors correlate in their response to the same large-scale event over a relatively short period of time. Dr. Matthew Whiteley, Vice President and Director of MZA’s Dayton Technology Directorate, used a single turbulence sensor in Dayton, Ohio to make the first known atmospheric turbulence measurements during a similar eclipse in August 2017. His measurements showed that the strength of turbulence decreased by a factor of three during the eclipse and then increased to its original level as the shadow moved on. The upcoming measurements will allow researchers to verify this result over a longer period of time and a much broader geographic area with sensors deployed coast-to-coast. The measurements will also show how weather conditions change with varying degrees of eclipse coverage.



A network of MZA's DELTA-Wx Deep Learning Turbulence Sensors will be operated before, during, and after the total solar eclipse on April 8, 2024.



The eTEST consortium includes several sensors along the path of totality in Ohio.