INFORMATION SHEET FOR THE FY2025 NOAA/OAR/WPO *VORTEX-USA* COMPETITION

General program priorities for interdisciplinary studies and transition to the Weather Enterprise

VORTEX-USA is a research program intended to improve the effectiveness of tornado forecasts and warnings in the U.S. This program represents an evolution from the VORTEX-SE program of 2015-2020. VORTEX-USA will extend the approaches and findings from that program to other regions of the U.S., while maintaining a strong emphasis on Southeast issues. New meteorological knowledge will be gained through examination of historical data, special datasets collected in the field through earlier VORTEX-SE campaigns, and the application of state-of-the-art numerical weather prediction and data assimilation systems. VORTEX-USA will also explore avenues for more effectively communicating tornado forecasts to the public, and evaluate aspects of public vulnerability, risk perception and response to these forecasts in order to more effectively mitigate damage, injuries, and loss of life from tornadoes.

Investigators should understand that VORTEX-USA is a program that is intended to have the *maximum possible near-term societal benefit* by reducing the impacts of tornadoes. In preparing and reviewing proposals, investigators and reviewers should assess the viability of moving results expeditiously toward application. This perspective should serve to inform investigators of the applicability of their proposal to a NOAA grant competition, in contrast with funding programs of other agencies such as the National Science Foundation. Basic research is not excluded in VORTEX-USA, but proposals for basic research carry a certain burden of convincing reviewers of a likely path toward application. The Notice of Funding Opportunity gives an example of Readiness Levels, and these should serve to give investigators a sense of how new knowledge can advance toward application in NOAA. VORTEX-USA knowledge may follow other paths leading to societal benefit through education of participants in the Weather Enterprise, insights into urban planning or codes, and a variety of diverse routes. Regardless of the exact route for transition, investigators should always consider how to advance their findings to application and positive societal impact beyond publishing and hoping that the new knowledge is “somehow” implemented.

In the past, VORTEX-SE has used several mechanisms to encourage interdisciplinary studies. The spectrum of approaches that are appropriate for VORTEX-USA-supported projects range from very narrow single-discipline efforts, to efforts that can only effectively proceed when they involve more than one discipline. The latter typically are more costly, often involving two or more principal investigators. Investigators need to be aware that reviewers will scrutinize the proposed budgets. Single-discipline proposals are not expected to generally cost near the annual grant limit ($500,000/project), while necessary inter-discipline collaboration may more easily justify budgets near the grant limit. In past

competitions, VORTEX-SE has limited single-discipline proposals to $300,000/project, and many worthy proposals have been received that fit within that constraint.

In this competition, we do not specify any required discipline areas for individual proposals. The mix of disciplines should be that which best facilitates the research goals.

Collaboration with elements of the Weather Enterprise

Past competitions have encouraged investigators to form collaborations with the Weather Enterprise, especially the NWS. Indeed, the first proposal review criterion (30 points weight) continues to be an assessment of the relevance to the Weather Enterprise, including NOAA. The general result from the past has been the inclusion of letters of support in proposals, but often only weak collaborative efforts have ensued. In this competition, we *discourage the practice of including letters of support*, with the exception of projects using datasets from the PERiLS field campaign (see more information below). On the other hand, we wish to encourage actual collaborations with the Weather Enterprise where possible and useful. **Hence, it will be a strength if proposals include an investigator(s) engaged in the operational aspects of the Weather Enterprise, and show a *substantive role* for that investigator(s) in the conduct of the project.**

PERiLS

VORTEX-USA, in collaboration with the National Science Foundation, supported a major field program in the Southeast U.S. in the 2022 and 2023 Spring seasons called Propagation, Evolution, and Rotation in Linear Storms (PERiLS). Data from the 2022 and 2023 campaigns is publicly available, and proposals utilizing PERiLS data sets *will be accepted* in the FY2025 NOFO competition. However, because the funding mechanisms for PERiLS datasets vary, and with them the requirements for data sharing, any proposals utilizing PERiLS data will require either (1) a letter of support from the principal investigator responsible for the dataset explicitly stating that the proposal investigator(s) will have access to that data set for their proposed work; or (2) that data set's principal investigator being an investigator on the proposed grant. *Investigators already funded to conduct research using PERiLS data sets cannot propose work already detailed in their funded grants if the ongoing research grant timeline extends into the FY2025 funding period.* Proposals to deploy new instrumentation or conduct new field campaigns will not be considered; investigators interested in collecting data should contact the VORTEX-USA Program Manager for more information.

Elaboration of Science Emphases

This section supplements the brief descriptions of program priorities from the funding opportunity announcement.

VORTEX-USA seeks to encourage new research proposals related to understanding and reducing societal vulnerability to tornadoes. Interdisciplinary research investigating the extent to which the physical, social and economic factors contribute to harm is needed and should draw from the following three main emphases:

- Investigating how physical, social, and economic factors interact to contribute to harm, and which intersections in particular contribute to severity of impact in different regional, local and household circumstances. Prior VORTEX-Southeast research has identified specific socioeconomic factors that contribute to vulnerability in the Southeast, e.g., the prevalence of manufactured housing. Further research in the Southeast and in other regions to identify and refine our understanding of these factors are key to reducing vulnerability.
- Understanding different populations' capacities to respond to forecasts and warnings for tornadoes, and current practices that can be utilized and leveraged to alleviate vulnerabilities and reduce harm from tornadoes in the Southeast and other regions.
- Understanding the factors and decisions that enhance individual survival of tornadoes under different circumstances. Given the vulnerabilities associated with mobile and manufactured housing that previous research has identified, studies and projects further examining the vulnerabilities and decision-making of residents in this type of housing are particularly encouraged.

Physical and/or social science studies focused on improving actionable information to the public and end users in the critical time period from 30 minutes to 4 hours prior to a tornadic event. This topic area has two main emphases:

- Improving probabilistic hazard and warning information in support of NWS strategic efforts to develop capacity to provide Probabilistic Integrated Decision Support Services.
- Researching products and messaging techniques that will provide consistent information that the public can utilize to support better decision making and outcomes, particularly in light of rapidly evolving technology (e.g., AI, improved communication technology such as ATSC 3.0, etc.).

Data management and availability

VORTEX-USA researchers are strongly encouraged to use existing VORTEX-USA data which are available in the catalogs maintained by UCAR's Earth Observing Laboratory (http://data.eol.ucar.edu/,

search for “VORTEX”). As mentioned above, extensive data was collected during the PERiLS field campaigns, and proposals leveraging this significant dataset are particularly encouraged.