WakeNet3-Europe-Workshop on Short-Term Weather Forecasting for Probabilistic Wake-Vortex Prediction

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Background and Scope

Wake vortex behaviour strongly depends on the prevailing meteorological conditions. Therefore, most wake vortex systems depend on forecasts of the meteorological conditions for the near future (10 min to next hour) and typically along large areas (e.g. glide path). Probabilistic wake vortex prediction aims at considering all the related uncertainties by producing envelopes for wake vortex trajectories and circulation with defined probabilities. For many applications the most important mechanism is the advection of wake vortices out of a flight corridor. Unfortunately, major uncertainties are related to the prediction of the crosswind and its fluctuations which are most relevant for lateral vortex transport.

Methods for probabilistic weather prediction appear to have a strong potential to improve probabilistic wake vortex prediction and thus to improve the performance of wake vortex advisory systems. Ensemble weather prediction methods may improve the prediction of average quantities and additionally may specify the related uncertainties of the predictions. However, for the short anticipated prediction horizons ensemble prediction may not be perfectly adequate. Probabilistic nowcasting methods may be less time consuming and well suited for the short prediction horizon. All these methods currently face interesting developments and have to be adjusted to the requirements of the specific application. At the same time integrated terminal weather systems are being developed that monitor the weather in the airport terminal area by the combination of multifaceted instrumentation. It is not obvious how and in which form the uncertainty information should be used optimally by the wake vortex predictors. Exploitation strategies may range from Prandtl mixing length approaches to Monte Carlo simulation.

The workshop shall bring together experts from the meteorological and the wake vortex communities to discuss the most promising methods in their disciplines and how they could be combined optimally in order to reduce uncertainties in wake vortex prediction and to adapt the probabilistic predictions to the predictability of the weather situation.

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