

## **Airborne Doppler LiDAR Sensor Parameter Analysis for Wake Vortex Impact Alleviation Purposes**

This paper presents a sensitivity study of a wake vortex impact alleviation system based on an airborne forward-looking Doppler LiDAR sensor. The basic principle of the system is to use this sensor to measure the wind remotely ahead of the aircraft. On the basis of these measurements the system estimates whether a wake vortex is located in front of the aircraft. If this is the case, the wake vortex characteristics are identified and the control deflections countervailing the wake-induced aircraft response are computed and applied. An integrated simulation environment comprising a full nonlinear 6-DoF A320 model (with control laws), wake vortex models, and the wake impact alleviation algorithms was developed. The LiDAR sensor subsystem has many design parameters that influence the overall performance in a complex way, which makes it difficult to derive adequate requirements. The presented parameter study provides first insights into the role of each parameter as well as some adequate parameter combinations.