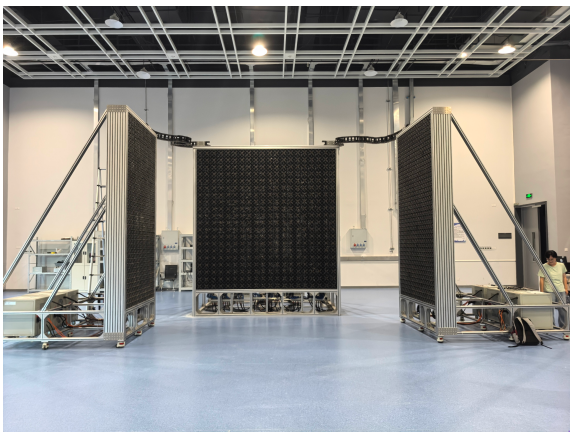
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Aerodynamic Technologies and AI for the Aerial Society —Making drones amd air taxis sustainable and wind-safe

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Abstract



Fan Array Wind Generator in our Aerial City Lab (Two Guinness World Records in 2025)

The rapidly evolving low-altitude economy transforms mankind into an aerial society: Drones and air taxis allow unprecedented transport and mobility overcoming traffic jams in congested metropolises and reaching remote rural destinations. Yet, drones and air taxis are far from aerodynamically optimized. More importantly, steady winds and wind gusts challenge the safety of air taxi and delivery drone operation in urban environments. These winds lead to unintended displacements and may result in potential collisions and accidents.

In this talk, we report on aerodynamic technologies and artificial intelligence addressing these wind safety challenges and improving aerodynamic performance for multicopter drones and air taxis. Topics include emulating atmospheric flow conditions in our aerial city lab, digitial twins of drones and air taxis, aerodynamic optimization for cruise and wind-aware flight control for take-off and landing.

This lecture is based on work of Prof. Noack's team in collaboration with DongTeng Technology and SZUAVIA as well as the teams of Profs. Tamir Shaqarin, Kun Wang, Chuntai Zheng, Nan Gao, Xiaozhou He, Hao Xiong, Hongwei Zhang, Dmitry Kolomenskiy, Stefano Discetti and Andrea Ianiro.