

Fast Autonomous Flight Near Structures in Large Indoor Environments

Sven Behnke

University of Bonn, Germany

Computer Science Institute VI

Autonomous Intelligent Systems



universität**bonn**



Fully autonomous indoor flight without external tracking.

MAV-based Autonomous Chimney Inspection

We present an autonomous inspection system for industrial chimneys based on a flying platform.

- We follow a **coverage pattern** with a high-resolution stereo camera to **reconstruct the chimney interior surface**.
- In a second flight, we **adopt selected positions** to allow for a more thorough remote inspection of damaged spots.
- Core functionality was tested in a **mockup** (left).
- Decommissioned **chimney S6** (right) from the former coal-mining facility **Zeche Zollverein in Essen, Germany**, was used for our experiments.



Conclusions

- Developed high-performance platforms for challenging scenarios
 - Warehouse stock taking
 - Chimney inspection
- 3D laser scanners are essential for mapping and localization as well as for reliable obstacle perception
- Hierarchical navigation planning and trajectory control
- Camera-based inspection
 - Reading of visual tags in the warehouse
 - Chimney surface reconstruction