

The specialists in the Robotic Systems Business Unit at the Fraunhofer IFF engineer and implement innovative automated and robotic systems. They develop solutions for industry and the service sector and act as coordinator and research partner in publicly funded projects.

The Robotic Systems Business Unit specializes in:

- Service robots,
- Robotic in life science,
- Robotics in manufacturing and
- Robotics in entertainment and training.

Services for automated facade cleaning include the:

- Development of concepts and preparation of feasibility studies and the
- Engineering of facade cleaning robots.



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With the cleaning robot for the glass hall of Leipzig's New Exhibition Centre, the Fraunhofer IFF developed its first fully automated facade cleaning system that has proven itself in continuous operation since 1997.

Automated cleaning systems have the following advantages over manual cleaning:

- Operating costs are low,
- Availability is high,
- Large areas are cleaned efficiently,
- Dangerous jobs are eliminated and
- Operation is semiautomatic or fully automatic.



Service robot for the automated cleaning of glass roofs. Here, on the roof of Berlin Central Train Station.



Basic modules of automated facade cleaning.



Cleaning Robot for Leipzig's New Exhibition Centre

The world's first fully automated cleaning system for vaulted glass roofs was developed in 1996 for Leipzig's New Exhibition Centre with glass surfaces measuring 25,000 m². It consists of two cleaning robots, one for the north and one for the south side, and a gantry on the ridge of the roof, which positions and secures the robots along the roof and supplies them with water.

Securing cable, cable and hose are coiled in drums on the robot and laid down gently on the surface of the roof during downward movement. The system uses a broad roller brush to clean the main glass surfaces and retractable swiveling disc brushes for areas around glass mounts.

Filius Cleaning System for Berlin Central Train Station

The cleaning unit Filius cleans the exterior glass surfaces of Berlin Central Train Station. The radio remote controlled system covers the entire roof surface of approximately 28,000 m². Four large balloon tires enable it to negotiate larger obstacles.

The cleaning unit is positioned below the gantry above the section of the roof to be cleaned and lowers itself from there. The drums for cable and hose are located on the gantry. The system uses a large roller brush to clean, which provides maximum contact even around the snow guards and rain gutters. The system cleans over 150 m² per hour.



The cleaning unit Filius Toni keeps the view clear atop the roof of Berlin Central Train Station.

SIRIUS_{ZV} Cleaning Robot for Fraunhofer Headquarters in Munich

This cleaning robot specifically for vertical facades is hung on the gantry instead of a gondola and cleans the glass facade of the high-rise Fraunhofer building in Munich.

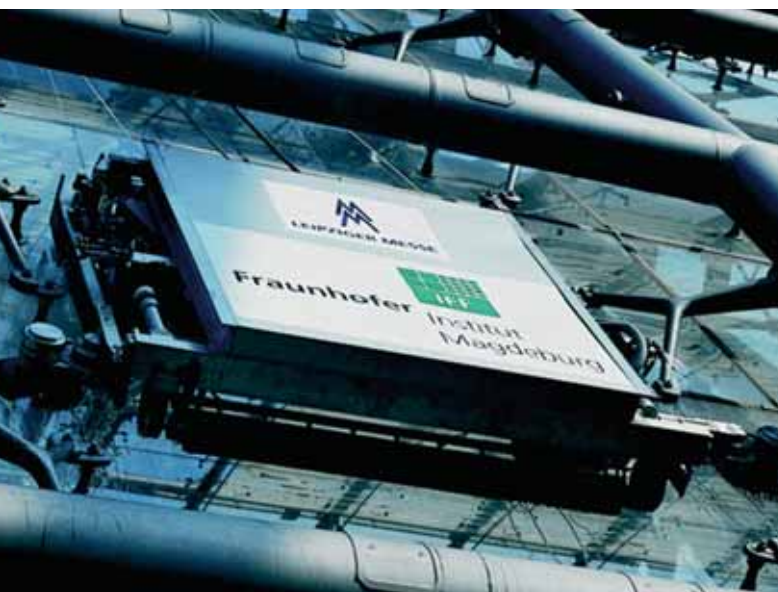
Rotating disc brushes clean the glass surfaces in a closed cleaning cycle, i.e. the cleaning water is suctioned up, filtered in the system and reused.

The robot's walking mechanism uses suction cups to secure it on the glass surfaces and thus safeguard it against winds.

Studies

Knowledge about the integration of automated cleaning systems is not as widespread as about other automated building technologies.

Feasibility studies identify the requirements for a robotic system and concept studies build upon them to deliver technical designs for the cleaning robot. Thus, architects and builders obtain detailed information enabling them to integrate it in design and construction plans.



Cleaning robot for Leipzig's New Exhibition Centre.



The cleaning unit Filius Toni in the eaves.



The fully automated cleaning robot SIRIUS_{ZV}.



A feasibility study was prepared for the Burj al Arab in Dubai, UAE.