

Cybersecurity research at Fraunhofer AISEC

Industrial Security Labs

The Industrial Security Labs at Fraunhofer AISEC enable a broad spectrum of security tests in a secure and trustworthy environment, from analyses in the areas of connected production, Industry 4.0, and the Internet of Things to tests of security in the area of building automation. Simulation environments make it possible to incorporate real-world components for security analyses modeled on actual situations. The Fraunhofer AISEC server landscape also allows for increased processing capacity for various simulations, including both augmented and virtual reality.

Model factory for security analyses

Fraunhofer AISEC has a model production line with multiple sub-stations in one of its lab spaces focusing on industrial security. This simulated factory makes it possible to use authentic industrial components that have been proven in practice. Thanks to its modular structure, the production line can accommodate a broad array of possible use cases and current threat scenarios under realistic conditions. This allows researchers to check security in production operations in a variety of ways.

Security for building automation

The lab equipment enables tests of common digital and connected items of installation technology in fields such as building automation and security. Computer-assisted training and experimentation systems can be used to simulate attacks on early warning systems such as fire and smoke alarms or on burglar alarms and sensors. This helps with development and testing of protective measures to ensure the security of equipment and communication protocols.



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1
*Production line
model*
2
Industrial fieldbus



Mechatronics demonstrator

Fraunhofer AISEC operates a mechatronics demonstrator at its Industrial Security Labs, bringing together characteristic mechanical and electronic components of automation technology in a single compact unit that is used for tests and experimentation modeled on real-world conditions. Actuators such as grippers, conveyor belts, separation compartments, and assembly robots are all operated together with suitable sensors by control units and display modules customary in industrial settings. This unit allows researchers to simulate specific attacks, demonstrate their effects, and implement and test security measures.

1 *Simulated attack on a robot arm*

2 *Connected production*



What we offer

Security in building automation

- Risk analysis and penetration testing for connected equipment and services
- State-of-the-art security for equipment and communication protocols
- Development and testing of protective measures
- Protection for know-how and tamper-proofing
- Intrusion detection and integrity monitoring
- Network and fieldbus security
- Data sovereignty and secure data storage

Security in production

- Risk analysis and penetration testing for connected production systems
- Studies of current threat scenarios under realistic conditions
- Visualization of a broad range of use cases drawn from real-world practice
- Protection for know-how and tamper-proofing
- Intrusion detection and integrity monitoring
- Anonymization and data protection for machine data
- Pairing of real-world components with simulations for security analysis
- Advice on implementing security standards