

A U B E ' 1 4

**15th International Conference
on
Automatic Fire Detection**

PROCEEDINGS

October 14 - 16, 2014
Universität Duisburg-Essen
Duisburg, Germany

UNIVERSITÄT
**DUISBURG
ESSEN**



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Preface

The 15th International Conference on Automatic Fire Detection, AUBE '14, is hosted by the University Duisburg-Essen and held in Mülheim an der Ruhr, close to Duisburg, Germany.

Important contributions for the conference and its preparation came from the University of Duisburg-Essen. The financial contributions of EUSAS e.V. (European Society for Automatic Alarm Systems e.V.) and the Fire Protection Research Foundation (FPRF) in order to success the conference are gratefully acknowledged.

The proceedings include all papers delivered to the editor in time. Papers are organized in the proceedings by the session topics at the conference. The content of the symposium proceedings have also been recorded in electronic form and provided on CD-ROM in color.

Session topics are:

- Standards, certification, EU regulations, EU directives and related aspects
- Smoke aerosol characterisation
- Test methods, special applications, multiple sensor and multiple criteria detection
- Smoke aerosol characterisation, gas detection
- Type testing, field testing, calibration methods
- Toxic gases, gas detection
- Testing procedures, domestic fire detection
- Gas detection, modelling and simulation aspects, detection in special applications
- Wireless detection, fire spread, detection algorithms in fire and security
- Wildfire fighting, gas detection, fire spread
- Fire detection in aircraft, special applications
- Detection by radiated emission, video detection



Prof. Dr.-Ing. Andreas Czulwik



Prof. Dr.-Ing. Ingolf Willms

Duisburg Fire Detection Laboratory



Department of
Communication Systems



<http://nts.uni-duisburg-essen.de>

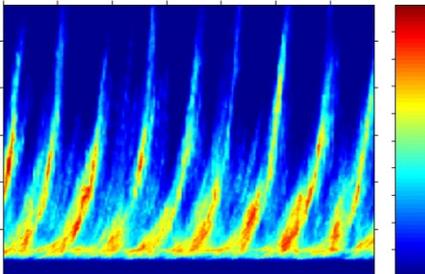
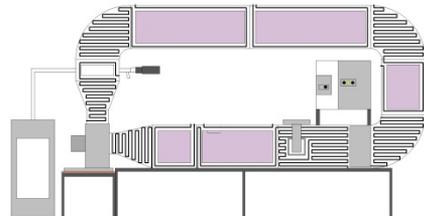


We develop

fast, intelligent and false alarm resistant smoke detectors,
detection algorithms,
test methods for non-fire tests,
individual problem solving

We focus on

modern sensors, fuzzy logic
and neural networks,
intelligent signal processing,
simulation techniques



We simulate

fires, fire sensors,
sensor signals,
spatial distribution
of fire parameters

We measure

Smoke density, temperature and particle size distribution during a fire ...
and much more ...

**University of Duisburg - Essen
Faculty of Engineering
Communication Systems, NTS**

**Research Group : Technical Security Systems (with main
emphasis on Automatic Fire Detection)**

Historical Review

- | | |
|--------------|---|
| 1961 | Setting up of a research group "Automatic Fire Detection" at the "Institut für Elektrische Nachrichtentechnik" at the RWTH Aachen.
Work on fire detector testing in co-operation with the industry and insurance organisations (VdS, CEA Comité Européen des Assurance, etc.). |
| 1962 ... | First conference on "Automatic Fire Detection" in Aachen. Enlargement of the research work on signal detection and processing in automatic security systems including testing and standardisation.
Work for the European CEA and several international testing establishments. Work on a variety of testing methods and (fire-) detection algorithms. |
| 1972 | Move of the research group to the newly founded Universität - Gesamthochschule Duisburg together with the appointment of its head, Prof. Dr. H. Luck, as a full professor for telecommunication.
Start of the construction of a special laboratory for fire detection purposes (Duisburg Fire Detection Laboratory), which finally was finished in 1988. |
| 1988 ... | Continued work on many aspects of design, testing and standardisation of automatic security systems for public and special applications.
Co-operation with industrial companies as well as international research establishments in Europe, Japan, China and the US.
Organisation of international conferences on automatic fire detection (AUBE '..) partly in co-operation with NIST (National Institute for Standards and Technology) in Maryland USA. |
| 2003 ... now | After the retirement of Prof. Dr. H. Luck the work is continued in the department "Communication Systems, NTS (Prof. Dr. A. Czyłwik)" of the united "University of Duisburg-Essen". Head of the Technical Security Systems Research Group is Prof. Dr. I. Willms. |

History of the AUBE-conferences, 1961 - 2014

1961	Aachen, Germany	University Seminar, RWTH Aachen, invited speakers
1962	Aachen, Germany	University Seminar, RWTH Aachen, invited speakers
1964	Aachen, Germany	University Seminar, RWTH Aachen, invited speakers
1966	Aachen, Germany	University Seminar, RWTH Aachen, invited speakers
1969	Aachen, Germany	University Seminar, RWTH Aachen, invited speakers
1971	Aachen, Germany	International Conference, RWTH Aachen, invited speakers
1975	Aachen, Germany	International Conference, RWTH Aachen, invited speakers
1982	Duisburg, Germany	AUBE '82 8th International Conference on Automatic Fire Detection Gerhard-Mercator-Universität Duisburg
1989	Duisburg, Germany	AUBE '89 9th International Conference on Automatic Fire Detection Gerhard-Mercator-Universität Duisburg
1995	Duisburg, Germany	AUBE '95 10th International Conference on Automatic Fire Detection Gerhard-Mercator-Universität Duisburg
1999	Duisburg, Germany	AUBE '99 11th International Conference on Automatic Fire Detection Gerhard-Mercator-Universität Duisburg
2001	Gaithersburg, U.S.A.	AUBE '01 12th International Conference on Automatic Fire Detection National Institute of Standards and Technology, NIST
2004	Duisburg, Germany	AUBE '04 13th International Conference on Automatic Fire Detection University of Duisburg-Essen
2009	Duisburg, Germany	AUBE '09 14th International Conference on Automatic Fire Detection University of Duisburg-Essen
2014	Duisburg, Germany	AUBE '14 15th International Conference on Automatic Fire Detection University of Duisburg-Essen

For the most recent conferences since 1982 full texts are available for all EUSAS members at "<http://www.eusas.de/publications/index.html>".

In Memoriam



Prof. Dr.-Ing. Heinz Luck 1934 - 2014

Professor Heinz Luck, Professor Emeritus of the University of Duisburg-Essen passed away on May 14, 2014 at the age of 80. As the former vice-rector for research and future academics, the dean of the Faculty of Electrical Engineering and Information Technology as well as professor of the teaching chair for Communication Systems for many years he rendered outstanding services to the University of Duisburg-Essen.

Professor Luck was one of the founding fathers of the Faculty of Electrical Engineering and Information Technology of the former Gerhard-Mercator-University Duisburg. He set the course for an excellent development of the faculty.

At the department Electrical Engineering he established the issue of fire detection, built up the Duisburg Fire Detection Laboratory and made it world-renowned by his diverse research activities. Definitely to note is the "AUBE", he had founded and led for many years and which is unique in this field. Furthermore, he considerably influenced lots of standards in this domain.

Professor Luck was one of the founding fathers of the European Society for Automatic Alarm Systems e.V., chairman for many years, and honorary chairman. He was a pioneer in the field of fire detection technologies, as an excellent chairman of EUSAS, a highly appreciated colleague, advisor, and friend.

The university was his life. Even long after his retirement he was participating in several areas of the faculty and was always a good advisor. With Professor Luck we have lost an outstanding scientist, a committed professor, a highly appreciated colleague and an always sympathetic superior. We feel with his family and he will stay alive in our mind as a remarkable personality.

AUBE '14 is supported by



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DUISBURG
ESSEN

Creative inspiration between the Rhine and Ruhr: the University of Duisburg-Essen (UDE) is located in the European region with the highest density of institutions of higher learning. Created in 2003 by the merger of the universities of Duisburg and Essen, the UDE is the youngest university in North Rhine-Westphalia and one of the ten largest universities in Germany.

<https://www.uni-due.de/>



The Technical Security Systems Research Group has worked for many years in the field of early fire detection. The large Fire Detection Laboratory in Duisburg provides facilities and the technology for research work. The laboratory is designed and equipped for fire tests in the incipient stage of a fire (e.g. EN54-7 tests) as well as for non-fire experiments.

<http://nts.uni-due.de/>



EUSAS e.V. is the European Society for Automatic Alarm Systems e.V. It provides a European platform for promoting fire protection and security comprising fire detection, extinguishing, intrusion detection, access control and video monitoring.

<http://www.eusas.de/>



The Fire Protection Research Foundation (FPRF) is an independent nonprofit organization whose mission is to plan, manage and communicate research in support of the National Fire Protection Association (NFPA) mission.

<http://www.nfpa.org/>