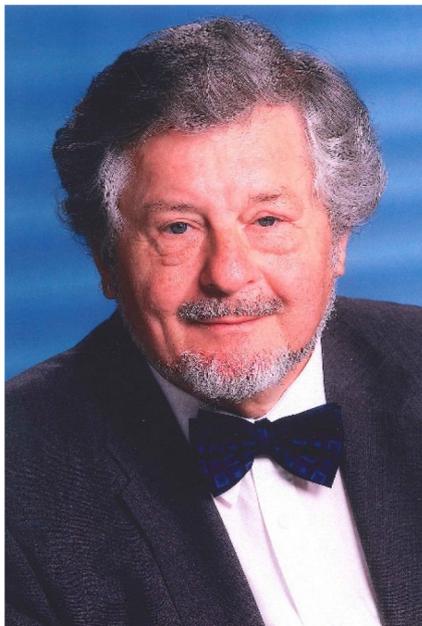


## In Memoriam Hiltmar Schubert



**P**rofessor h.c. Dr. Hiltmar Schubert, an experienced scientist, universal teacher, successful research manager and special person passed away on December 27<sup>th</sup> 2020 at the age of 93, having had a rich and remarkable long life. His German and international friends, partner, colleagues, and his family greatly regret his passing.

**D**ue to the pandemic it was not possible to hold the appropriate funeral ceremony and only a few had the privilege of saying goodbye in a small but very dignified celebration with his family and relatives.

**I**n his professional career Hiltmar contributed to an impressive variety of science disciplines, and especially in his core topic of energetic materials and systems where he guided numerous scientists to success.

### Leadership and Innovation

**D**r. Karl Meyer founded the Institut für Chemie der Treibstoffe (ICT, Institute for Chemistry of Propellants) and asked Hiltmar to join this institute as one of his two deputy directors. After the retirement of Dr. Meyer, ten years later, Hiltmar took over full responsibility, and served as director of the Fraunhofer ICT until 1994, by then the Fraunhofer Institute for Chemical Technology. Under his leadership the institute gained an international reputation in the fields of propellants, explosives and pyrotechnics. In 1970, he successfully established a commercial research branch, initially

including safety technology, airbag research and environmental engineering.

**A**fter the fall of the Iron Curtain, the collapse of the former Soviet Union and the re-unification of Germany, Hiltmar addressed the need to redirect priorities to meet a new research and business environment, market economy, and especially military technology conversion. He and the Institute, for example, became pioneers in the safe and final disposal of energetic materials and other military equipment, a topic which initiated environmental research on recycling and closed-loop resources management, today better known as the 'circular economy'.

**A**s a consequence of major cuts in defense budgets in the 90's, Hiltmar expanded and enhanced the research of ICT into new markets, applications and technologies. He launched strategy development, supported by external advisors, and he quickly realized that such fundamental changes require sound human resource policies. He responded both by hiring new people and by educating the existing staff in new management principles and customer orientation. He initiated and implemented the restructuring of the ICT, which was the real challenge in his later years as an executive. This was also 30 years ahead of its time.

**T**his new strategy was further developed and implemented by his successors Prof. Dr. Peter Eyerer and Prof. Dr. Peter Elsner, who balanced successfully continuing defense re-

# Obituary

search with the emerging fields of applied electro-chemistry, environmental engineering and polymer technology.

## Fit for the Future

**H**iltmar's commitment to science and research management is clearly evident with three decades (1959–1994) of dedicated service to the "Fraunhofer-Gesellschaft für Angewandte Forschung e.V.", the German umbrella organization for applied and contract research. He was one of the members in the scientific council of Fraunhofer which developed the organization from a relatively unknown society to the first ranked contract research institution in Europe. As a long-term chairman of the council, he was one of the creative brains in incorporating relevant modern industrial topics. His engagement encouraged the "Gesellschaft" to focus on an effective structure for contract research especially insisting on the successful "Fraunhofer Model" of financing.

**I**n 1978 Hiltmar was also elected as president of the "Gesellschaft für Umweltsimulation (GUS)" the German Society of Environmental Engineering, and he was re-elected until 2006. Aiming to improve quality and reliability, he challenged designers and manufacturers to develop products better suited to the needs of environment and sustainable use. In 1985, together with partner organizations in other European countries, he founded the Confederation of European Environmental Engineering Societies (CEEES), serving as its president from 1988 to 1990. In acknowledgement of his outstanding commitment to the improvement of relations between the USA and Europe, he was declared a "Fellow of the Institute of Environmental Sciences "(USA) in 1997.

## Communication

**I**n 1976, together with the publishing house Verlag Chemie/Weinheim, now Wiley-VCH, Hiltmar launched the international journal "Propellants and Explosives", as a successor of the purely German-language "Explosivstoffe". This journal became a success story attracting scientists from all over the world to publish their work in it. In 1982, he worked to establish the journal as the official journal of the International Pyrotechnic Society and the journal name was changed to "Propellants, Explosives, Pyrotechnics" also known as PEP. Hiltmar enhanced PEP into a peer-reviewed journal, to increase its impact factor and to strengthen its scientific and technological quality. He guided and assisted his successor editors in the USA and Germany and invited internationally renowned experts to serve on the Editorial Advisory Board, which meets once a year during the ICT Conference on Energetics. He missed this board meeting but once.

**I**n 1969, Hiltmar initiated the International Annual ICT Conference of the Fraunhofer Institute which has become a key event for the international community of energetic materials. Scientists from all over the world meet, exchange ideas, share results on high explosives, gun propellants, solid rocket propellants, gas generators and pyrotechnics.

**T**he conference has also proved to be an ideal event to have more open discussions. Numerous invitations to eastern scientists to attend the conference, supported by Hiltmar Schubert, acted as catalysts for meeting and exchange between east and west.

## Automotive Safety

**U**nder his guidance, the International Symposium & Exhibition Airbag 2000+ on "Sophisticated Car Occupant Safety Systems" was launched by Karl-Friedrich Ziegahn in 1992. It enabled Fraunhofer ICT to be the leading independent R&D organization for airbag technology, covering the full range of topics from synthesis of new gas generating materials, to ignition, developing prototypes and their testing. Attracting more than 1000 participants and including an exhibition by leading industrial partners it serves as an initiator of innovative technologies, for example environmentally friendly gas generators, smart airbag concepts and sensors, which have led to a significant reduction in human injuries from accidents. Fraunhofer ICT itself has made substantial contributions and innovations to this field over the years. Hiltmar was one of the first automobile drivers who was hit frontally in his air bag fitted BMW without injuries – a scientist in an involuntary self-test!

## Science for Peace

**H**iltmar later focused on "Science for Peace" programs and the environment, covering humanitarian de-mining and non-lethal weapons, anticipating the importance of asymmetric conflicts and the need for strong opposition to terrorism. These too led to important international cooperation such as an event in Porto in 2001, on demilitarization, which led to further work in the NATO Research Organization as well as in other fora, such as EDA. He knew how to inspire, support and then step back leaving work to those he trusted.

**H**e represented Germany in NATO's Disarmament Panel, traveling very often to the former Soviet countries and organizing workshops and seminars aimed at stabilization and the disarmament of former Eastern bloc countries. In collaboration with others, he edited the contributions to these NATO workshops and conferences to produce widely-used manuals in the NATO Science for Peace and Security program. He served together with international colleagues

in the working group established after 9/11 events to develop explosives detection in planes. After the 2004 attacks in London and Moscow then Madrid in 2005, NATO decided to extend the working group scope to mass transportation protection. Hiltmar remained a member of the working group till 2006. In December 2005 he organized an Advanced Research Workshop at ICT in which the STANDEX Program (Stand-Off Detection of Explosives) was defined in terms of concept and technologies. Hiltmar supported this program, brought strong support and followed up development until the live demonstration in the Paris metro in June 2013. This demonstration was, to his delight, a great success.

## Society and Global Change

**H**iltmar was active in addressing society challenges in a rapidly changing world. He participated in the 'World Federation of Scientists' (Geneva, Moscow, Beijing) where he addressed aspects such as megacities, the consequences of climatic change, resource management and sustainable development as the chairman of the working group "Limits of Development".

**E**nvironment and safety were important to him. This included the management of environmental challenges to the global economy and addressing unemployment, the harmonization of economy and ecology, with sustainable use of production plants.

**H**e encouraged his younger colleagues to go beyond limits and borders, which he always probed. His belief that this is the only way to achieve real progress in research is his most prominent legacy for the younger generation of scientists.

## A Life Full of Experience

**A**s a 16-year-old boy Hiltmar Schubert served in the final phases of World War II in the air defense artillery around his home city of Dresden and experienced the horrors of war. After the war he finished school and then the 'veteran' Hiltmar studied chemistry at the universities of Kiel and Karlsruhe. He completed his PhD thesis on pharmaceutical substances and started his professional life in the field of the chemistry of solid rocket propellants at the Technical University of Karlsruhe.

**A**s a chemist, Hiltmar dedicated his life to science and technology. He had based his successful management and leadership skills on only two fundamental statements: "Use your sense and reason" and "Establish a positive relationship with your co-workers". Hiltmar became the generally accepted authority and 'Doyen' of Germany's explosives research community. Not surprisingly his professional career was also marked by a long list of publications, reports and patents and a remarkable set of achievements.

**P**rofessor h.c. Dr. Hiltmar Schubert received the Bundesverdienstkreuz (Federal Cross of Merit), acknowledging his outstanding engagement in research and development. Well-respected for his kind nature and outstanding knowledge, he experienced a life full of challenges and success stories. He became a universal expert in the explosives' community and an outstanding multi-disciplinary scientist with a global reputation. We all will miss him but commemorate him with honor.

Karl-Friedrich Ziegahn, Adam Cumming, Randy Simpson,  
Pierre Charrue, Norbert Eisenreich<sup>1</sup>,  
the Editors, the Editorial Offices

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<sup>1</sup>Contributions prior to passing