



FRAUNHOFER-INSTITUTE FOR TECHNOLOGICAL TREND ANALYSIS INT

## THE INSTITUTE AT A GLANCE





## THE FRAUNHOFER INT IN PROFILE

The Fraunhofer Institute for Technological Trend Analysis INT provides scientifically sound assessments and counseling on the entire spectrum of technological developments. On this basis, the Institute conducts Technology Forecasting, making possible a long-term approach to strategic research planning. Fraunhofer INT constantly applies this competence in projects tailor-made for our clients.

Over and above these skills, we run our own experimental and theoretical research on the effects of ionizing and electromagnetic radiation on electronic components, as well as on radiation detection systems. To this end, INT is equipped with the latest measurement technology. Our main laboratory and large-scale appliances are radiation sources, electromagnetic simulation facilities and detector systems that cannot be found in this combination in any other civilian body in Germany.

For more than 40 years, INT has been a reliable partner for the Federal German Ministry of Defense, which it advises in close cooperation and for which it carries out research in technology analysis and strategic planning as well as radiation effects. INT also successfully advises and conducts research for domestic and international civilian clients: both public bodies and industry, from SMEs to DAX 30 companies.

## DEFENSE TECHNOLOGY FORESIGHT

Defense Technology Foresight (WZA – Wehrtechnische Zukunftsanalyse) is the Business unit which covers all services provided by TASP, Fraunhofer INT's Technological Analysis and Strategic Planning Department, for the Federal Ministry of Defence and its downstream offices - especially for the Federal Office for Bundeswehr Equipment, Information Technology and In-Service Support (BAAINBw) and the Bundeswehr Office for Defence Planning (PlgABw).

The technology-oriented futures research of WZA provides our clients with reliable knowledge for their orientation, and decision-making guidance on likely future developments in science and technology and their potential military implications. This includes in particular the early detection of emerging technologies, as part of a comprehensive technology monitoring system, and their specific assessment for defense clients. We also observe and analyze relevant international research planning processes and strategies, from which we derive recommendations for the national planning process.

These services are provided by our scientists and engineers, of whom many have long years of experience in this field. The joint result is a broad competence in all relevant science and technology sectors, supplemented by comprehensive methodology and processing skills. Regular exchanges with our network of national and international partners, and an internal peer review process are cornerstones of our quality management. Thanks to the many years of cooperation with government authorities, we can tailor our research and the presentation of its results in the best possible way to meet our client's needs.

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## PUBLIC TECHNOLOGY AND INNOVATION PLANNING

The business unit TIP (Public Technology and Innovation Planning) provides innovation management tools for public sector organizations. The innovation management portfolio, which includes elucidating future needs, identifying state-of-the-art and future solutions and facilitating their implementation, ensures that our clients are able to successfully meet their current and future challenges.

### **How does strategic technology and innovation planning benefit our clients?**

Climate disasters, political extremism and organized crime are just a few of the challenges that public agencies and organizations have to face today. To effectively deal with the constantly changing nature of threats, our clients have to continuously assess their own capabilities and review research and innovation (R&I) developments. However, the breakneck pace of developments in both technological and non-technological research severely impedes the ability of organizations to remain up-to-date and thus prevents the acquisition and integration of novel solutions. This difficulty in identifying and integrating innovative

solutions is aggravated at European and international levels due to non-aligned national regulations and standards as well as the interests of an ever growing number of stakeholders.

TIP helps its clients by identifying their current and future capability needs, analysing the innovation climate, and developing tailor-made R&I strategies. We empower organizations to meet future challenges head on to fulfil their role as guardians of society.

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## CORPORATE TECHNOLOGY FORESIGHT

CTF, the business unit Corporate Technology Foresight, advises companies on questions of future technologies and strategic planning. CTF draws on a highly qualified and experienced workforce that covers an extremely broad range of scientific and methodological skills. In the framework of institutional funding, the team works together continuously to scan the entire future technology landscape for new technological trends and developments, at the same time continuing to develop foresight methods.

New Technologies are changing both Market and Competition. Technological change is accelerating rapidly, technology lifecycles are becoming shorter, and cross-industry technology developments such as digitization are becoming more and more important. These changes jeopardize existing business models and, sooner or later, create the need for sudden adjustments. Specialized technology expertise is the strength behind many technology-oriented companies, but this does not help them to recognize critical changes early. It runs the risk of solely focusing too narrowly on the company's own portfolio, thus overlooking important developments and new opportunities in new and

related technology areas.

CTF is the business unit that helps companies to identify the entire range of relevant changes in good time. It assesses a company's current situation in order to identify and analyze relevant developments. CTF also provides methodological advice and helps companies to develop or adapt foresight processes. So doing, it gives its clients particular support in strategy, foresight, innovation management, research and development, and business management.

Contact

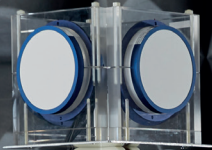
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## ELECTROMAGNETIC EFFECTS AND THREATS

EME, Electromagnetic Effects and Threats, is the business unit which conducts applied research in the coupling of electromagnetic fields into structures and systems, in the vulnerability of electronic circuits to fields and interference signals, and which analyzes electromagnetic threats. This work belongs to the broad field of electromagnetic compatibility (EMC), and makes a considerable contribution to the national capacity to assess the effects of electromagnetic weapons and corresponding protective measures.

Part of EME's work is developing methods for measuring electromagnetic fields and the electromagnetic properties of innovative materials in the microwave range. In addition, EME can use the measuring facilities it develops in other EMC measurement tasks. Experimental work is complemented by numerical simulations.

INT operates very powerful field simulation systems and metrologically covers frequencies up to the higher gigahertz range. In addition to military applications, these facilities and EME's expertise are also available to civil clients. Internationally, INT cooperates with defense institutions, universities, the defense industry and research bodies.

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## **NUCLEAR SECURITY POLICY AND DETECTION TECHNIQUES**

The business unit Nuclear Security Policy and Detection Techniques (NSD) has wide-ranging experience in detecting nuclear and radioactive material on-site. This makes it possible to analyze and assess nuclear and radioactive threats based on non-peaceful activities.

This capability is based on theoretical simulation and experimental measurement using systems that detect radioactive and nuclear material. These systems include both gamma and neutron detectors. The latter also include active neutron beam methods using portable neutron generators as well as the development of a mobile setup for neutron radiography.

NSD analyzes the characteristics of detectors and detector materials. It hereby considers physical parameters such as detector efficiency and energy resolution, and aspects such as user-friendliness and the reliability of measurement results.

In the field of nuclear security policy and arms control, the business unit monitors and assesses the scientific and technical side of current developments, in particular with regard to nuclear weapons and terrorist threats.

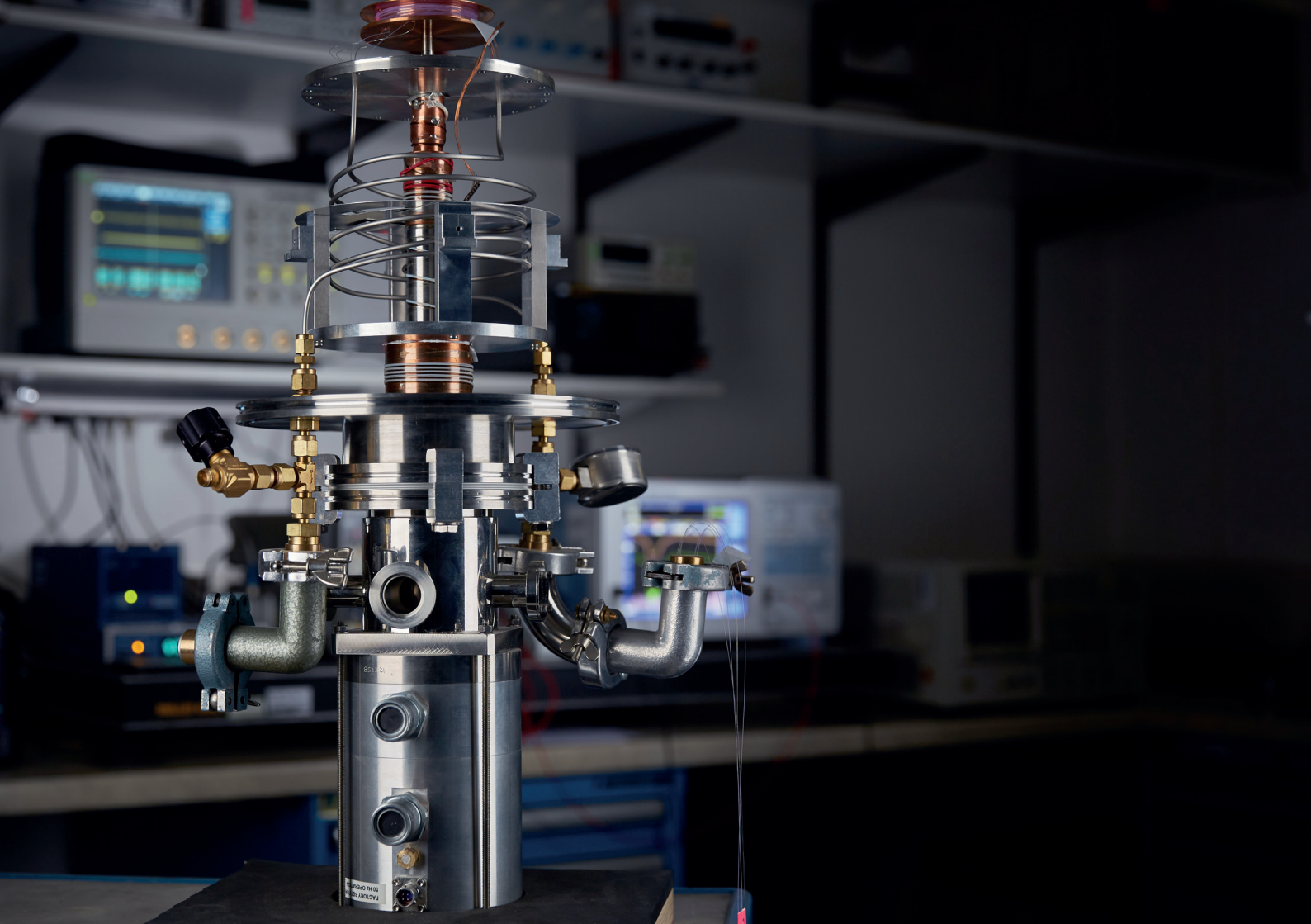
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## NUCLEAR EFFECTS IN ELECTRONICS AND OPTICS

Fraunhofer INT's business unit Nuclear Effects in Electronics and Optics (NEO) is a specialist in the effects of ionizing radiation on electronic, optoelectronic and optical components and systems. Its expertise rests on the more than 40 years of INT experience.

INT conducts radiation tests in accordance with recognized standards and advises companies on the radiation qualification and hardening of components and systems. Lessons learned from radiation tests are also used in the development of radiation sensors. The radiation facilities used for these tests are either installed on location at INT, or are available externally.

Also available are a variety of modern devices for measuring electrical and optical parameters, as well as a mechanics workshop and an electronics laboratory. This means that many tests can be performed without the presence of staff or equipment from the client.

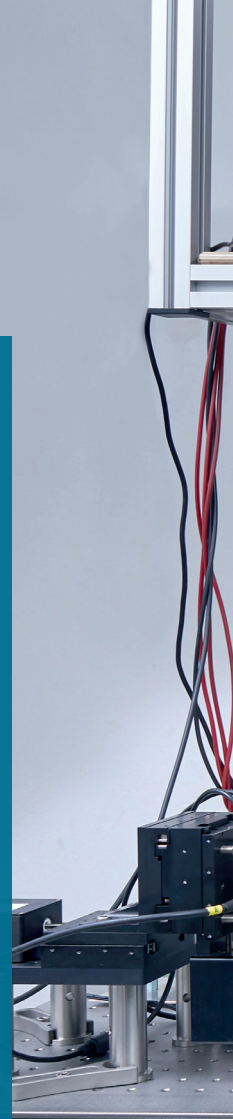
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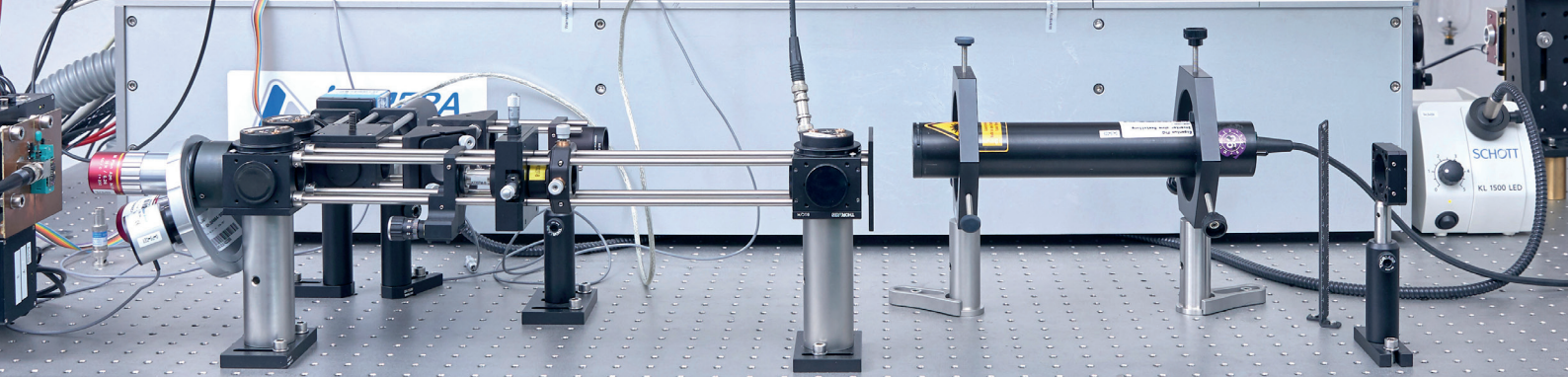
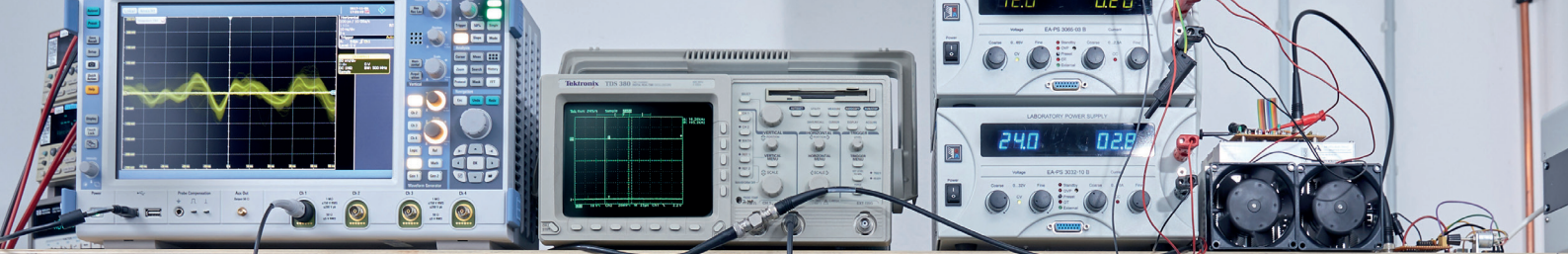


## KEY ACTIVITIES

- Technology Foresight (360°)
- Advanced Technology Analyses (Materials, ICT, Power Engineering, Robotics, Biological Technologies, Optical Technologies, Nanotechnology)
- Defense Technology Foresight
- Methods and Methodologies for Futurology
- National and International Research and Technology
- Security and Atomic/Chemical Threat Aspects
- Information Procurement and Management
- Electromagnetic Effects
- Nuclear Detection and Security Policy
- Nuclear Effects in Electronics and Optoelectronics
- R&T Planning in Security and Defense









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