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Fraunhofer 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. Furthermore, Fraunhofer INT runs its 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.

The Business Unit »Nuclear Security Policy and Detection Techniques« has extensive experience in detecting nuclear and radioactive material in-situ. This leads to the ability to assess and analyze nuclear and radiological threats based on non-peaceful activities.

This capability is based on theoretical simulations and experimental measurements with systems for the verification of radioactive and nuclear material. The detection systems are mainly gamma detectors and neutron detectors.

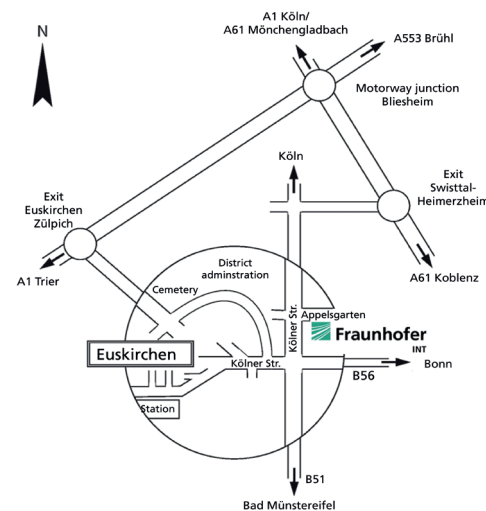
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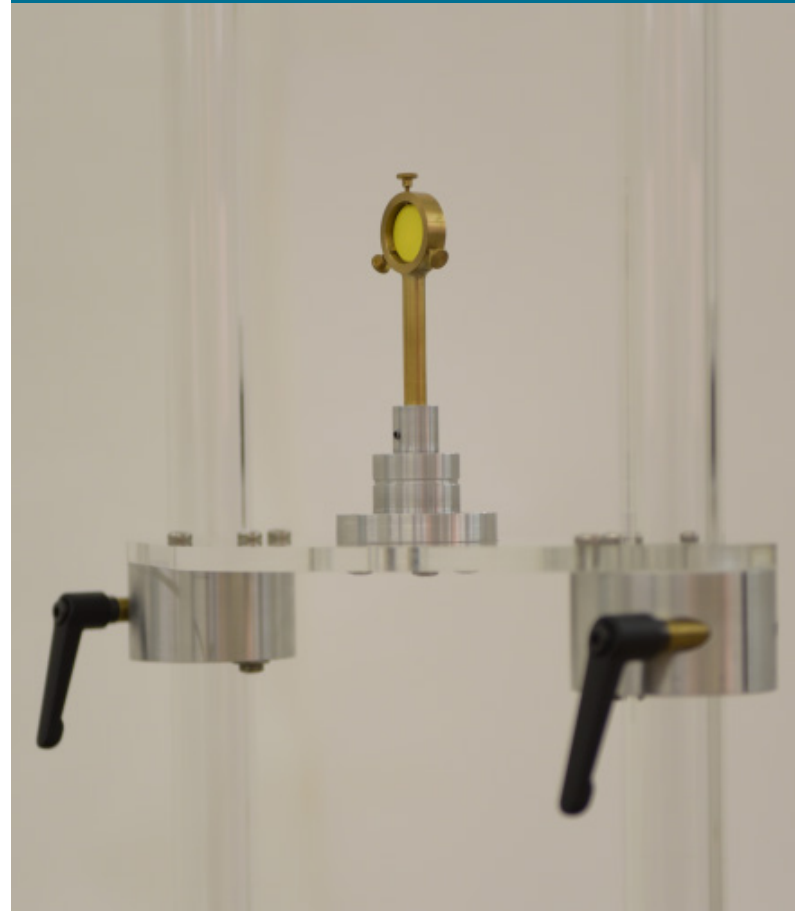
### Contact Person

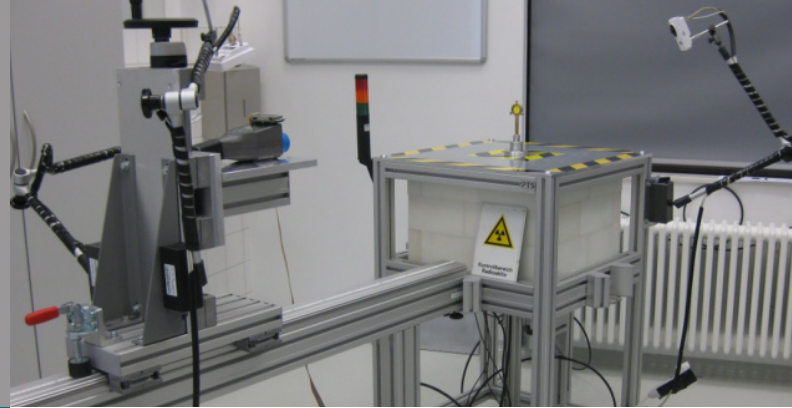
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QuTeSt

## QUALIFICATION TEST SYSTEM FOR RADIATION DETECTION DEVICES





## QUALIFICATION TESTS

Measurement equipment for the detection and identification of radioactive and nuclear (RN) material has a wide application area. A common element is the necessity to rely on the information given by the manufacturer concerning the performance and reliability of the used devices. Reliable test results available from third parties are also important to qualify new measurement devices or already deployed devices. This is especially relevant during the procurement of new devices, as well as for the comparison between different equipment and for the classification of gained measurement results.

Testing can be performed against the consensus standards in order to have reproducible test results, independent of testing location. Fraunhofer INT has conceived and built a test environment to perform the corresponding dynamic and static test measurements using neutron and gamma sources. The qualification system was established and part of a round robin test during Phase II of the project "Illicit Trafficking Radiation Assessment Programs (ITRAP+10)", initiated by the European Commission.

The test environment consists of a dynamic and a static test system.

## SYSTEM SPECIFICATIONS

### Static Test System

- The system consists of up to three guide rails with roller carriages which enables tests in parallel.
- A pneumatic lift up mechanism is used for the sources to be moved out of the shielding in about 0.35 s.

### Dynamic Test System

- A battery powered, automated trolley runs on a rail system and drives radioactive sources by the device to be tested.
- Track length of up to 40 m.
- The velocity will be set as needed (0.02 m/s- 2.2 m/s).
- Vertical source position up to 450 cm above ground.
- Moderator or shielding material can be added.

### Test System Generals

- Specially designed fast interchangeable source holders.
- The systems are transportable and can be brought where needed.
- Video system for observation and documentation of the measurement results.
- A variety of different radioactive gamma and neutron sources available.
- Environmental data collection system.

## TEST SPECIFICATIONS

### Radiation Detection Devices\*

- (Spectroscopic) Radiation Portal Monitor **SRPM / RPM**
- (Spectroscopic) Personal Radiation Detector **SPRD / PRD**
- Radiation Isotope Identifiers Device **RIID**

### Examples of Qualification Tests\*

- False alarm / False identification
- Photon and neutron alarm
- Accuracy for photons
- Time-to-alarm
- Gamma response of a neutron detector
- Detection of neutrons in a high gamma field
- Over-range
- Radionuclide identification

### Standards and Test Procedures\*

Tests in accordance with ANSI (American National Standards Institute), IEC (International Electrotechnical Commission) or ITRAP+10 (Illicit Trafficking Radiation Assessment Program) procedures.

\*These lists are not definitive.