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**Thermographic Methods for Nondestructive Materials Evaluation
and Materials Research**

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and
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Saarbrücken, Germany

The seminar will introduce the principals of thermographic imaging and the present state of infrared camera technology. Several applications of infrared thermography for materials evaluation will be discussed. Material defects close to the surface of a test object can be detected if the surface is heated by a laser, a flash lamp impulse, or by hot air and the temperature dynamics is observed by an infrared camera. These thermographic techniques have been successfully applied for the inspection of several types of coatings and the detection of delaminations and impact damage. Examples for the inspection of metallic and organic coatings will be presented. For the detection of cracks and other material flaws, power ultrasonic pulses are applied to the test object. Heat is generated at the defect site and is visualize by the infrared camera. Cyclic mechanical loading of turbine blade material generates heat due to dissipative effects. Based on this principal, a method for characterization of the fatigue degradation of Ti-6Al-4V has been developed.

Dr. Norbert Meyendorf has worked in the field of materials testing and nondestructive evaluation for more than 15 years, after eight years of experience at a welding institute as a welding metallurgist. He has a Ph.D. in physics and a science degree in materials science. At the Central Welding Institute in Halle, Germany, he has developed thermographic techniques for the control of weld processes and welding metallurgical research. Since 1987, he was responsible for several research projects in the field of materials characterization and nondestructive testing. Most of them were related to thermal methods. From 1998 to 2000, he was responsible for a strategic initiative of the Fraunhofer Society in Germany. This was a joint project of at least nine Fraunhofer Institutes and covers the whole field thermography including the development of infrared cameras, image processing, thermal modeling, and application of thermographic methods for NDE and industrial process control. Dr. Meyendorf's present affiliation is at the University of Dayton Research Institute. As the Director of the Center for Materials Diagnostics, he was responsible for a MURI program on NDE for aircraft materials. Dr. Meyendorf has more than 100 publications in metal physics, welding technology and nondestructive testing. He is chairman of the committee of specialists for materials characterization of the German Society of Nondestructive Testing.