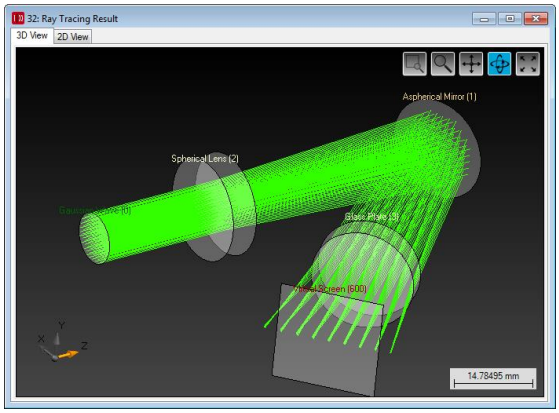
**Software Course: "Introduction to LightTrans VirtualLab™"**
Monday, September 22, 2014 – Tuesday, September 23, 2014
Course Time: 9 am – 5 pm.

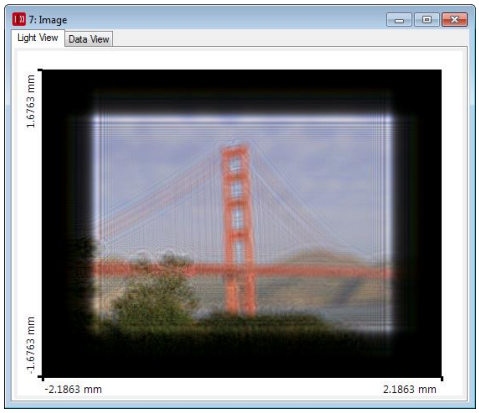
**Speaker:** Hartwig Crailsheim, LightTrans VirtualLab UG.

**Requirements**: User without or with low knowledge of VirtualLab™.

**Abstract:**

The software course gives an introduction into the principles of unified optical modeling and field tracing methods of VirtualLab™. Components of the user interface of VirtualLab™ are introduced and the different types of documents are discussed in detail. Participants will learn step by step about components, sources and detectors of VirtualLab™. The setup and the simulation of optical systems are going to be practiced on various laser systems. The goal of the course is that participants are able to model and simulate simple laser systems.




The figure on the left side shows an optical system – setup and simulation by Field Tracing and Ray Tracing are introduced in the course. The right figure shows an image out of the image plane – how light is represented in VirtualLab™ is one of the first topics in the course.

**Software Course Topics, 1st Day:**

- **Introduction to the concepts of field tracing and unified optical modeling for the simulation of light in optical systems:** electromagnetic light model and numerical data storage in VirtualLab™, visualization of light distribution, field tracing concept of modeling of light propagation through free spaces and components using different physical models, evaluation of light distributions using detectors, physical and numerical modeling errors.
- **Introduction to VirtualLab™ documents:** Light Path Diagram, Parameter Run Document, Optimization Documents, Session Editors, VirtualLab™ Explorer and Property Browser.

**Software Course Topics, 2nd Day:**

- **Simulation of paraxial and non-paraxial lens systems:** aberration analysis, import of lens data from Zemax, modeling of vector propagation effects in lens systems, investigation of focal regions, simulation of point spread function (PSF) and modulation transfer function (MTF), modeling of laser systems and space frequency filters, propagation of laser beams through optical systems, analysis of laser beam parameters, analysis of diffraction effects at apertures.
- **Polarization of light:** definition of coherent laser beams having arbitrary uniform polarization, generation of laser beams having varying polarization over the beam diameter, visualization of polarization state over beam diameter, simulation of polarizers and phase retardation plates.
- **Calculation of interferograms and simulation of interferometers:** calculation of interference patterns of two or more light distributions, modeling of interferometers with a coherent light source.