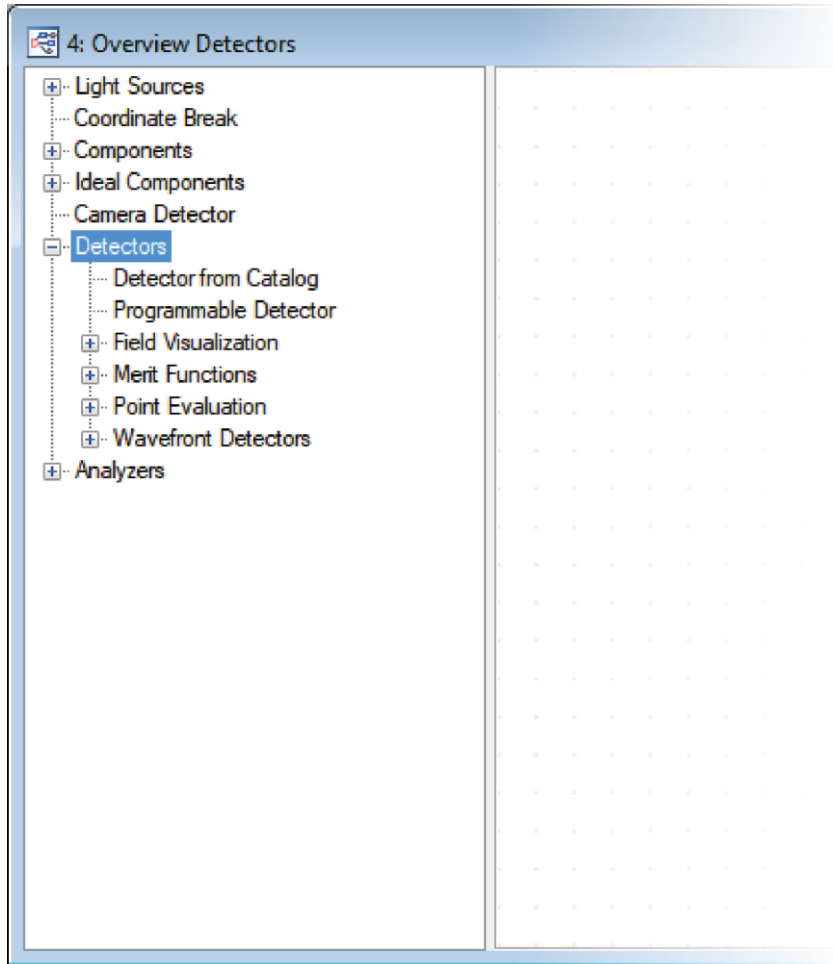


Overview of Detectors

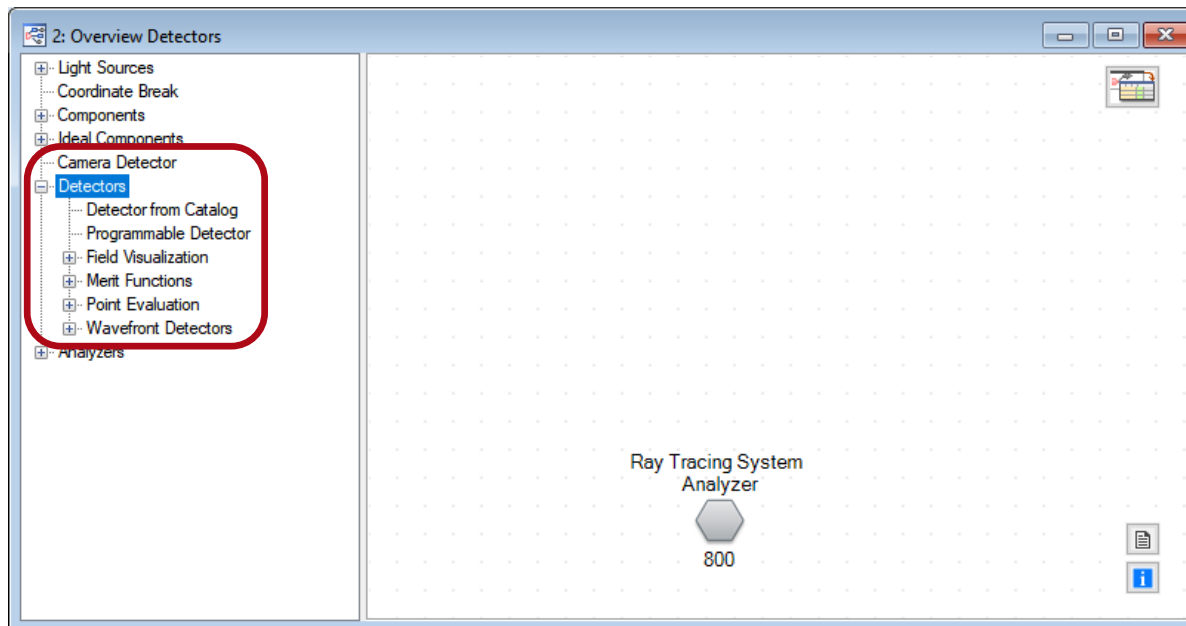
Abstract



Detectors are a fundamental part of any optical system, allowing the scientist to access the physical information that light carries. In VirtualLab Fusion there are a series of predefined detectors available to the user, as well as customized or customizable ones. Some of them provide a peak into how the dot diagram or the field look at the detector plane. Others quantify specific magnitudes, like total power or spot size. In this document you may find an overview of the detectors which are readily available in VirtualLab Fusion.

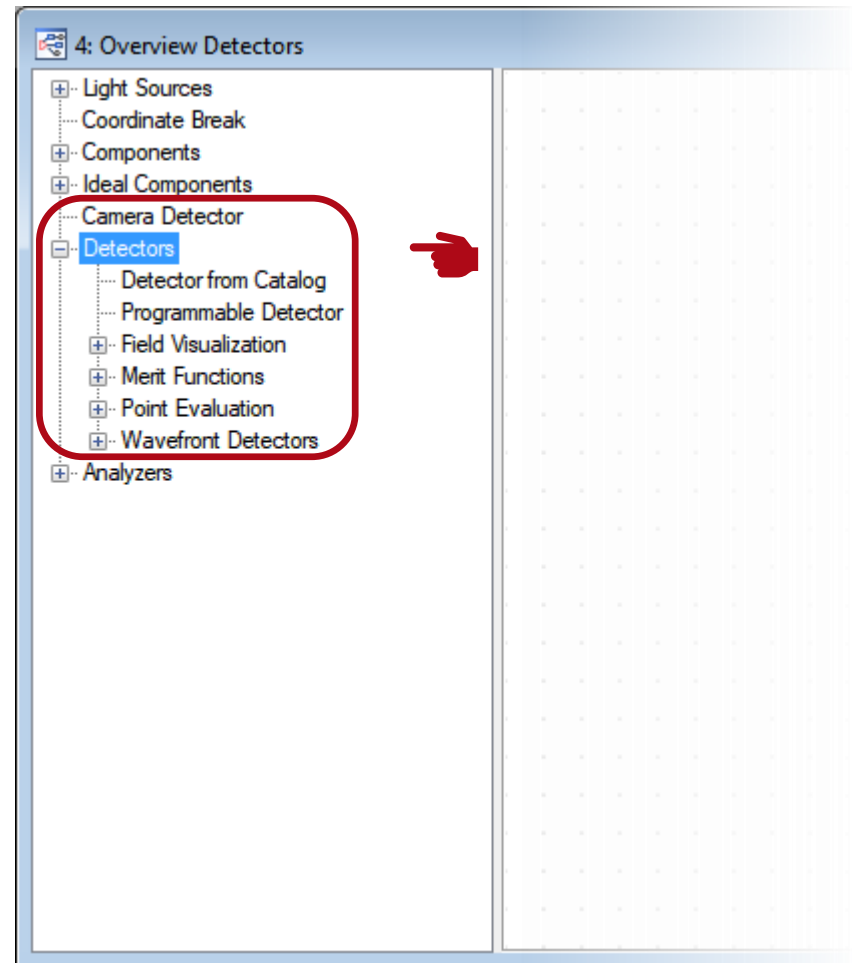
This Use Case Shows...

- An overview of the detector categories.
- As an example, a detector of each category is described in more detail.



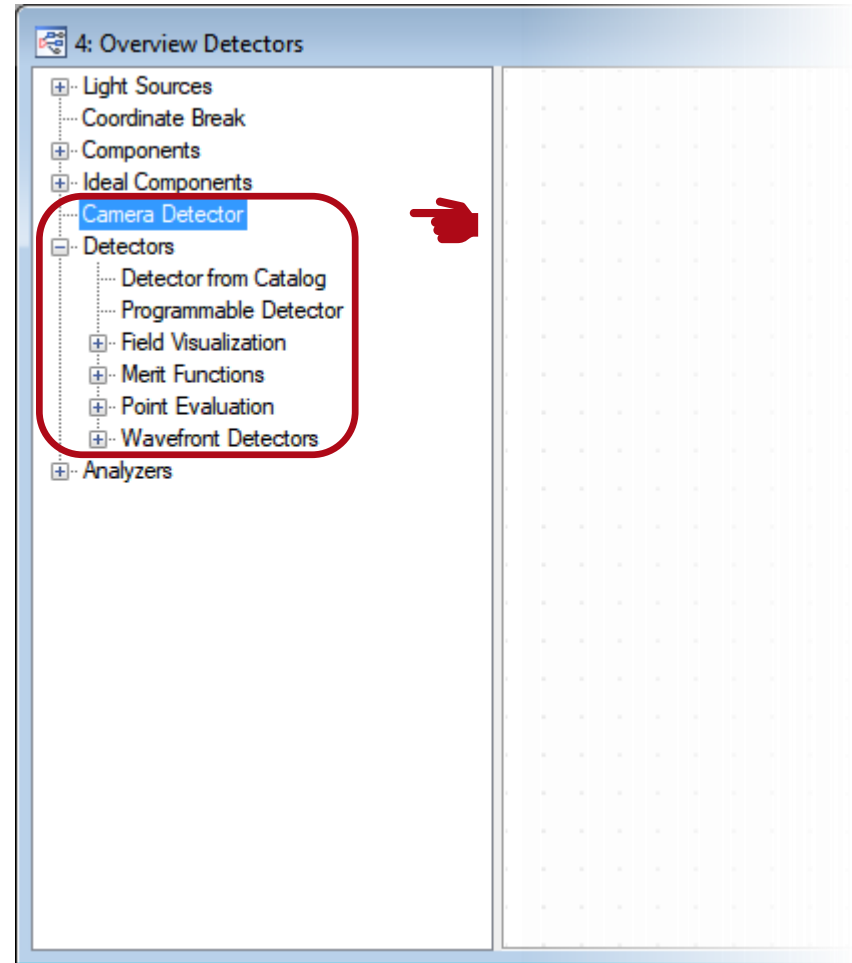
Categories of Detectors

- Detectors / Category
 - Detectors are categorized as follows
 - *Field Visualization*
 - *Merit Functions*
 - *Point Evaluation*
 - *Wavefront Detectors*
 - In addition there are customized detectors available either *Detectors from Catalog* or *Programmable Detectors*.



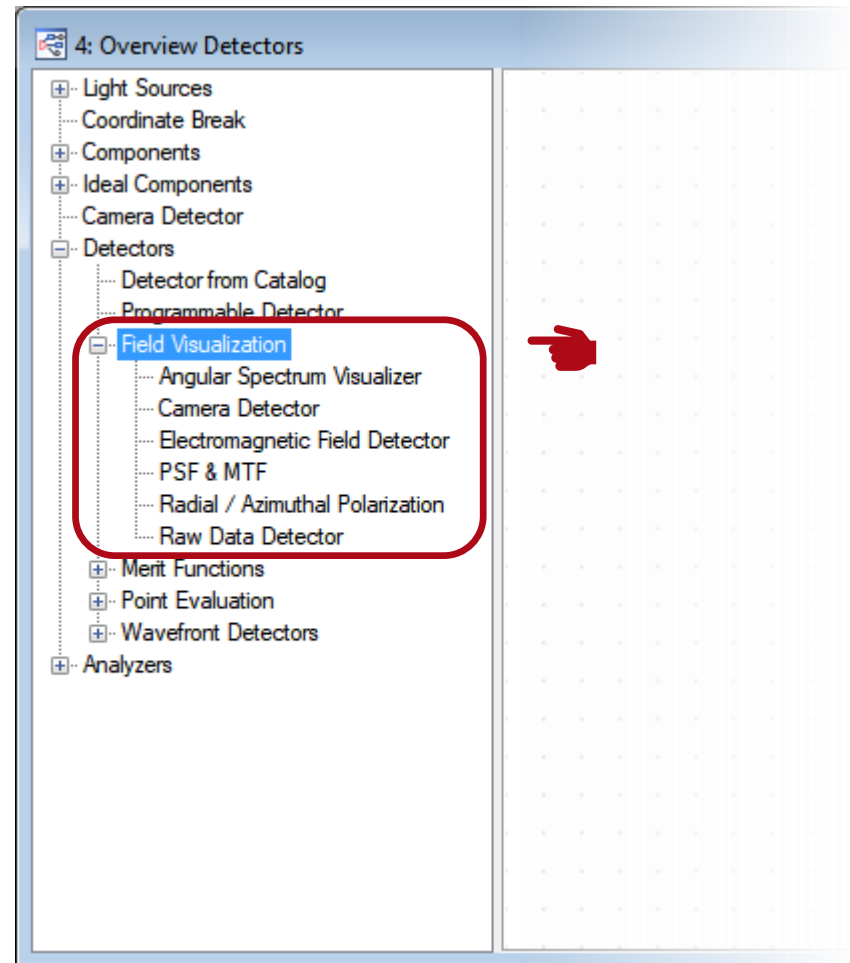
Camera Detector

- Camera Detector
 - In general the *Camera Detector* should be used as default detector for each optical system.
 - It enables access either to the energy density distribution of the electromagnetic field data in case of field tracing or to the ray data in case of ray tracing.



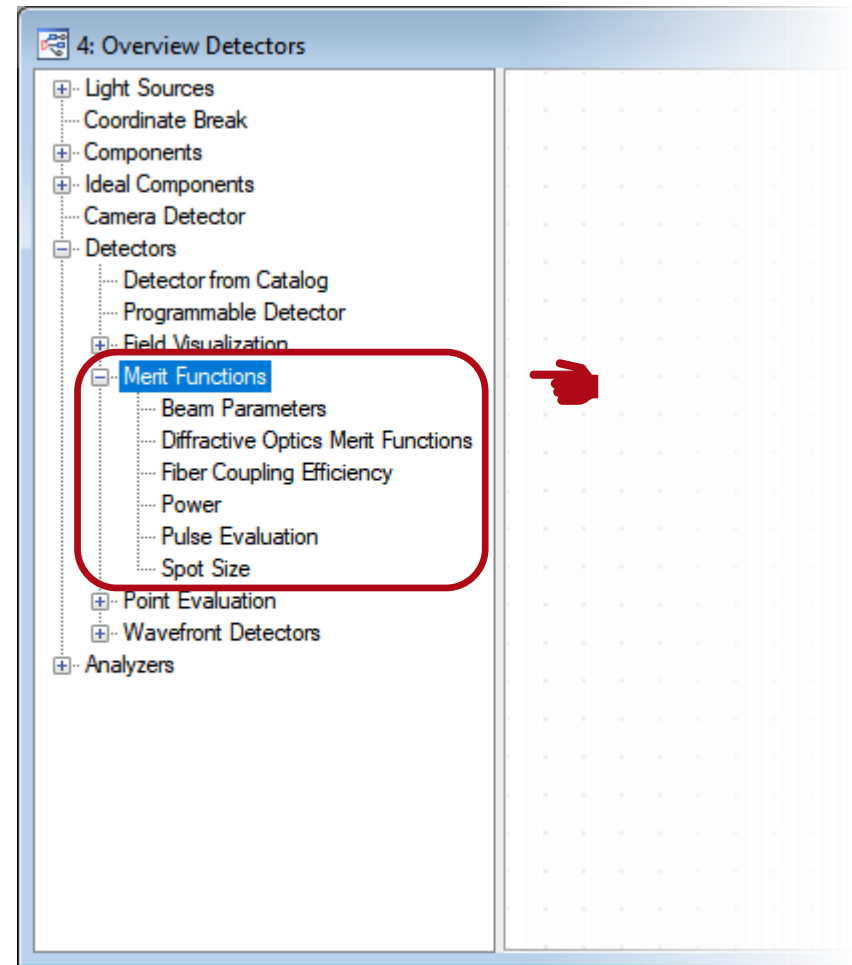
Field Visualization Detectors

- Field Visualization Detectors
 - These detectors visualize the electromagnetic field data.
 - As an example the *Electromagnetic Field Detector* enables access to the whole electromagnetic field consisting of the electric and magnetic field components:
 - $(E_x, E_y, E_z)^T$
 - $(H_x, H_y, H_z)^T$



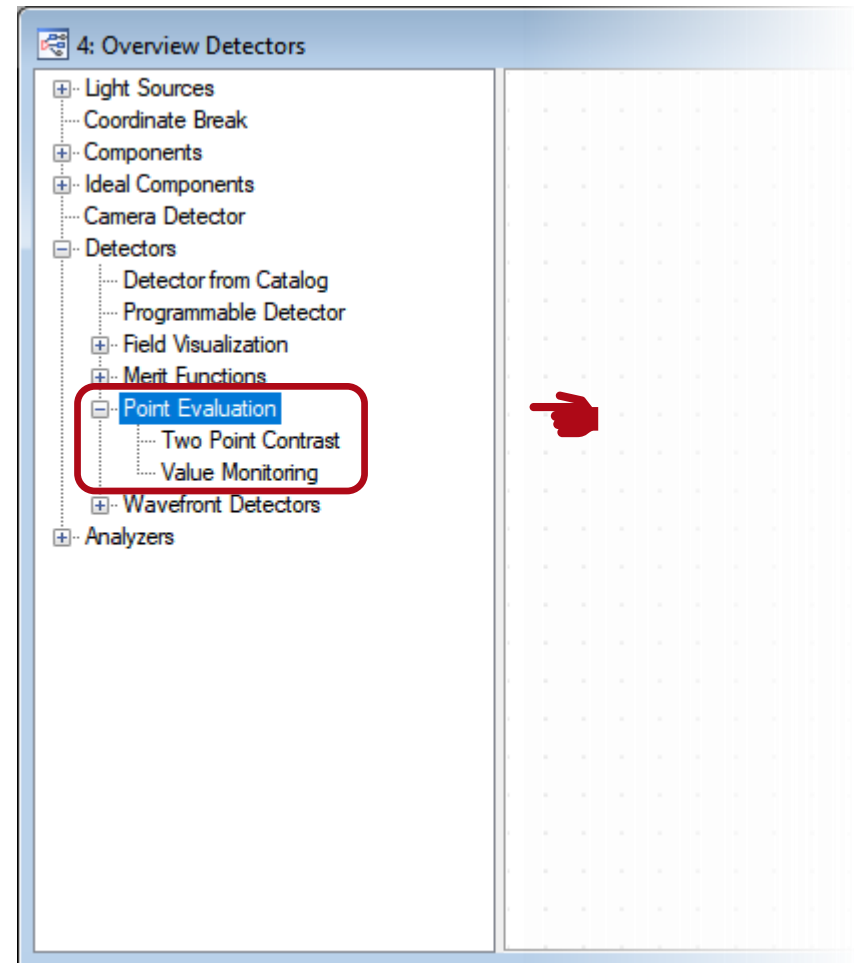
Merit Function Detectors

- Merit Function Detectors
 - These detectors are used to evaluate certain performance criteria of an optical system.
 - These parameters are typically used to define merit functions for e.g. parametric optimization.
 - As an example the *Spot Size Detector* calculates the size of a beam or a ray bundle.



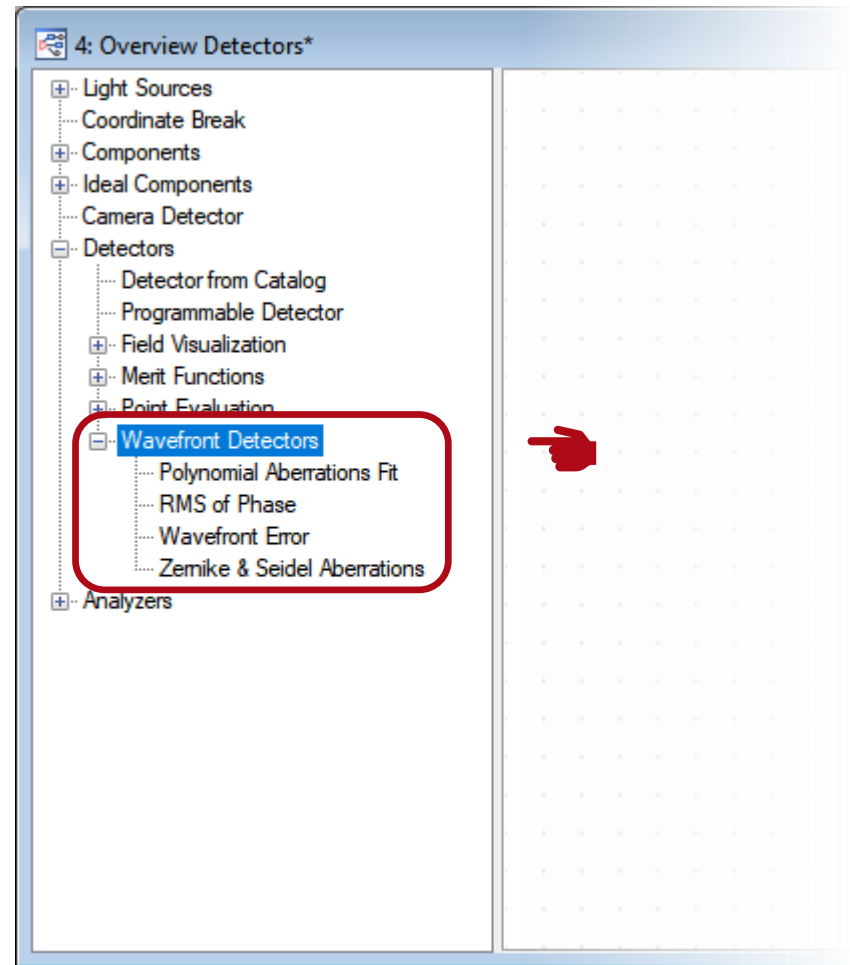
Point Evaluation Detectors

- Point Evaluation Detectors
 - These detectors evaluate the field or ray data on certain points in space.
 - Using the *Value Monitoring Detector* certain field quantities can be analyzed on a specified point in space.
 - In combination with the parameter run e.g. the intensity along the optical axis can be analyzed.



Wavefront Detectors

- Wavefront Detectors
 - These detectors can be used to evaluate the wavefront of the light on certain planes in space.
 - Typically, the wavefront is fitted with appropriate mathematical functions like certain polynomials.
 - As an example the *RMS of Phase* or the *Wavefront Error Detector* calculates the deviation to a constant or spherical wavefront.



Document Information

title	Overview of Detectors
version	1.0
VL version used for simulations	7.0.3.4
category	Feature Use Case
