Inline Spray Jet Control

Using Reflected Light Method l Using Transmitted Light Method (Single-channel and Multi-channel Systems) l For the Ex Area

Single-channel inline spray jet monitoring in the Ex area using the reflected light method

When extremely small amounts of spray need to be detected, a reflected light spray jet system is the obvious choice.

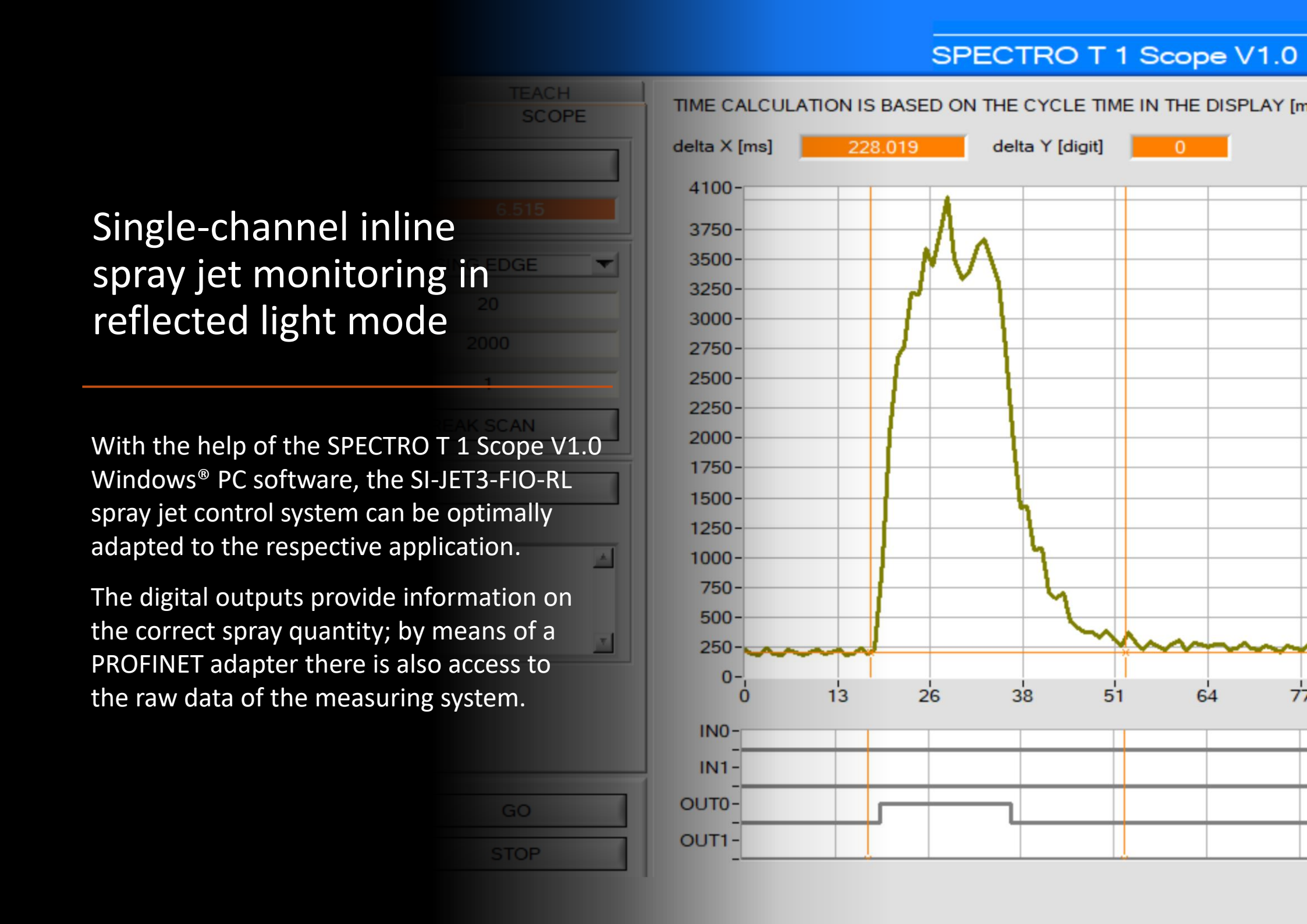
The SPECTRO-T-1-FIO-RL spray jet control system in conjunction with the ABL-V-ARRA-KL-M18-XL-A3.0 fiber optic frontend has a hardware integrator that enables even the smallest amounts of spray to be reliably detected. By means of the fiber optic frontend, the system is also Ex area compatible.

The blow air attachment unit integrated in the frontend prevents droplets being deposited on the optics. The working distance of the measuring sensor to the spray jet is 50mm.

Single-channel inline spray jet monitoring in reflected light mode

With the help of the SPECTRO T 1 Scope V1.0 Windows® PC software, the SI-JET3-FIO-RL spray jet control system can be optimally adapted to the respective application.

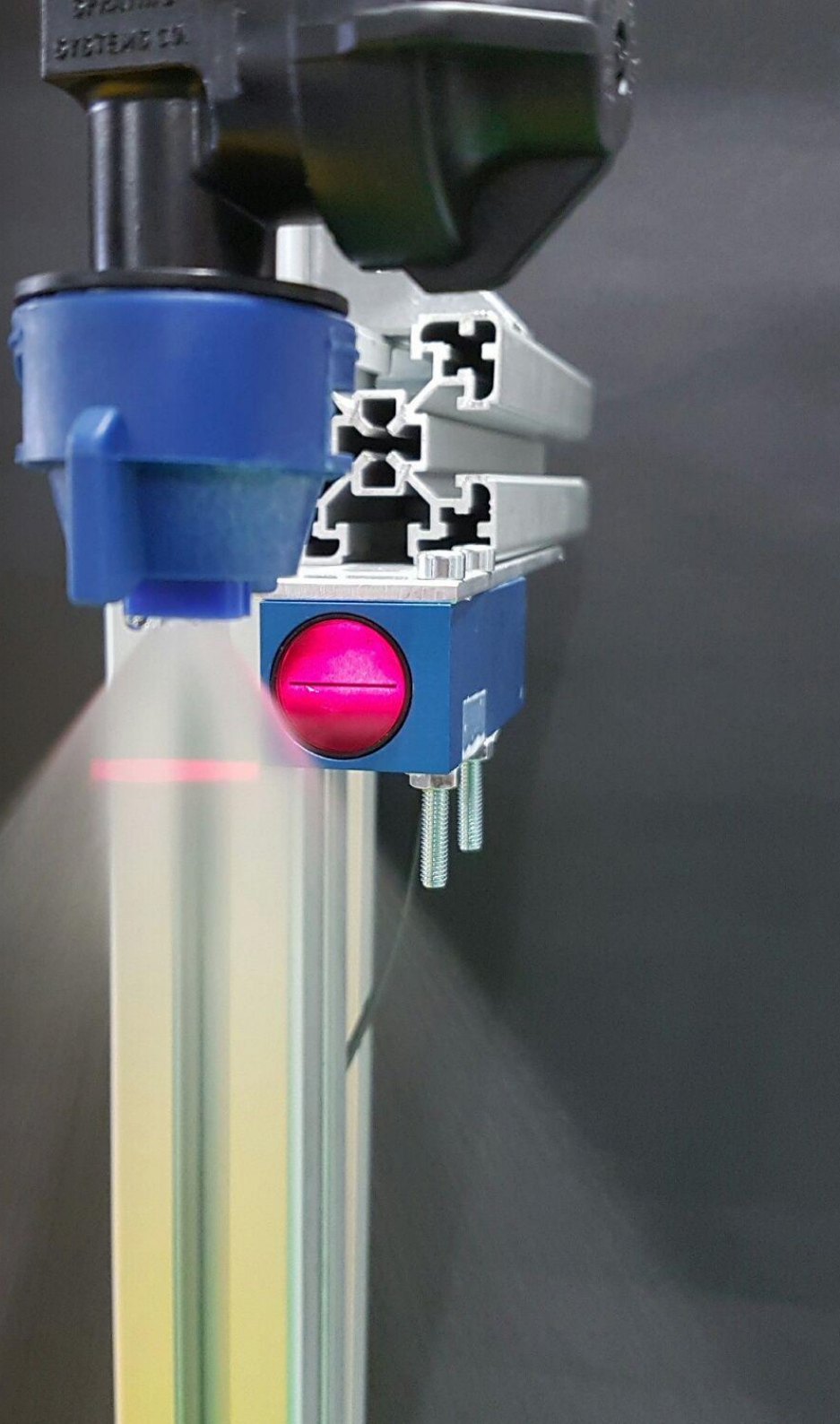
The digital outputs provide information on the correct spray quantity; by means of a PROFINET adapter there is also access to the raw data of the measuring system.

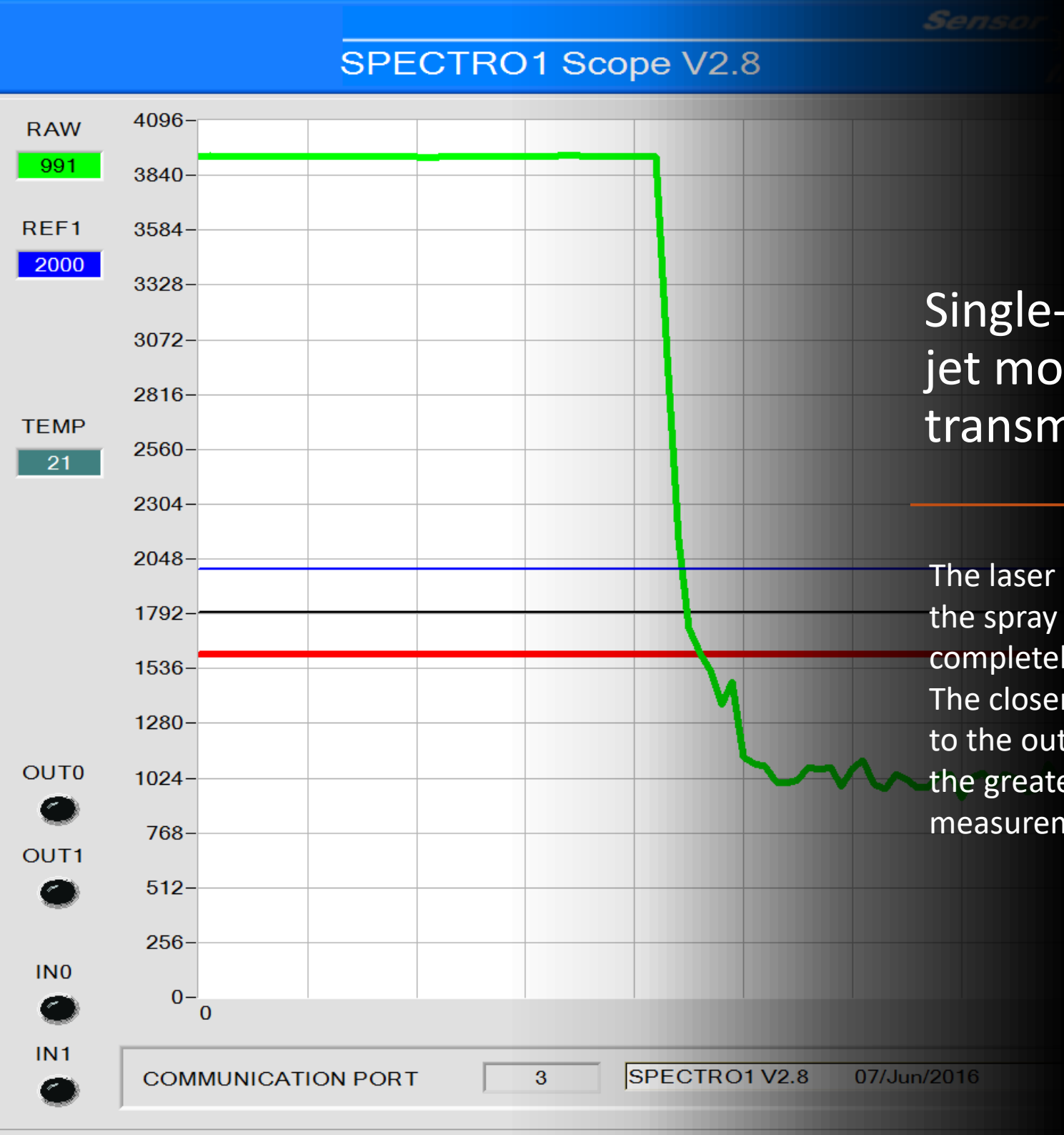


Single-channel inline spray jet control systems using the transmitted light method

If the system requires a larger distance to be maintained between the sensor system and the spray jet to be measured, there is no alternative but to use a transmitted light system.

With the help of the SPECTRO-1-CONLAS electronic control unit and the frontends of the A-LAS-N series, laser spots from 0.3mm diameter up to 16mm x 2mm are available.





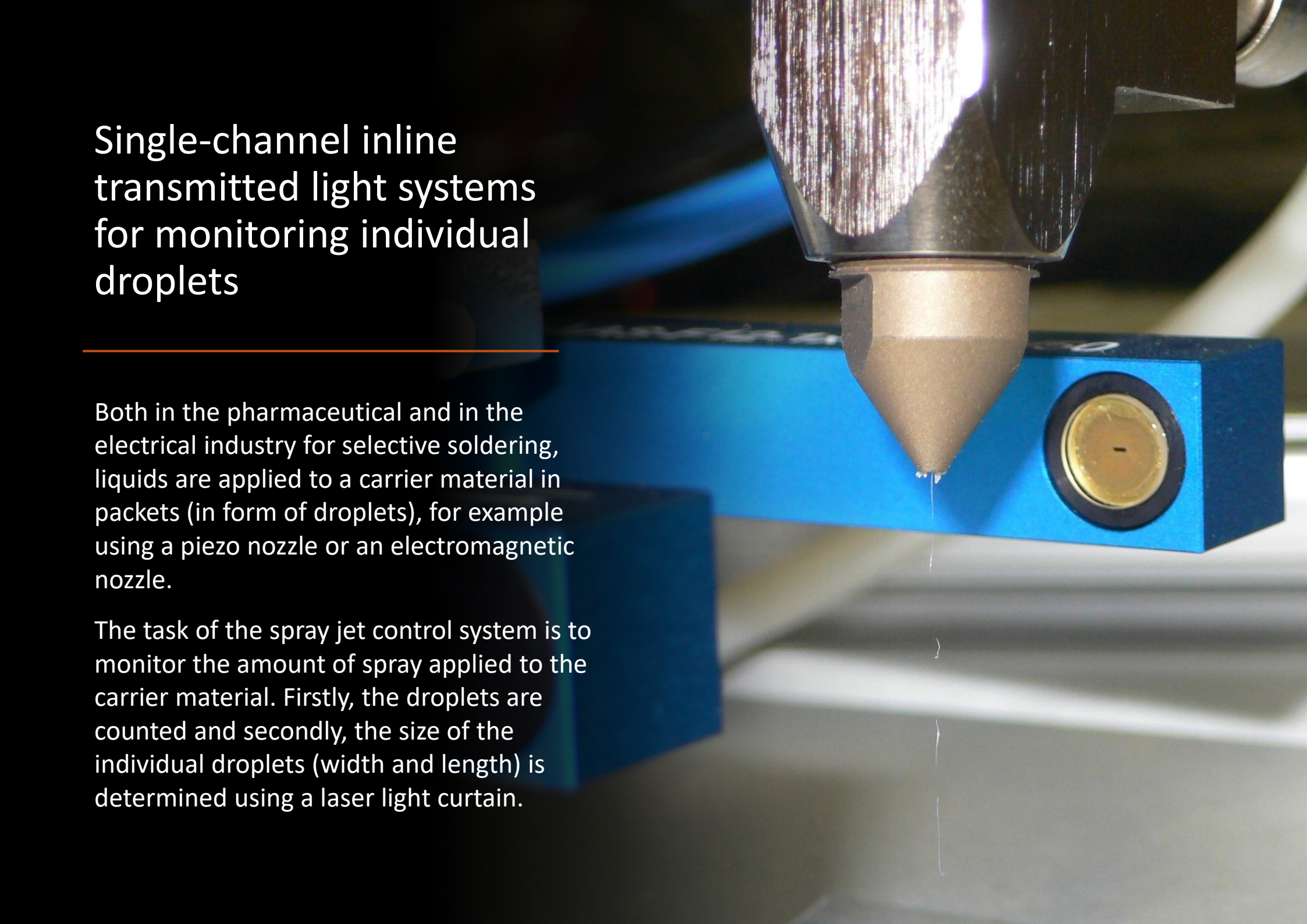
Single-channel inline spray jet monitoring using the transmitted light method

The laser light spot is directed onto the spray cone in such a way that it is completely covered by the spray jet. The closer the laser light curtain is to the outlet opening of the nozzle, the greater the influence on the measurement signal.

Single-channel inline transmitted light systems for monitoring individual droplets

Both in the pharmaceutical and in the electrical industry for selective soldering, liquids are applied to a carrier material in packets (in form of droplets), for example using a piezo nozzle or an electromagnetic nozzle.

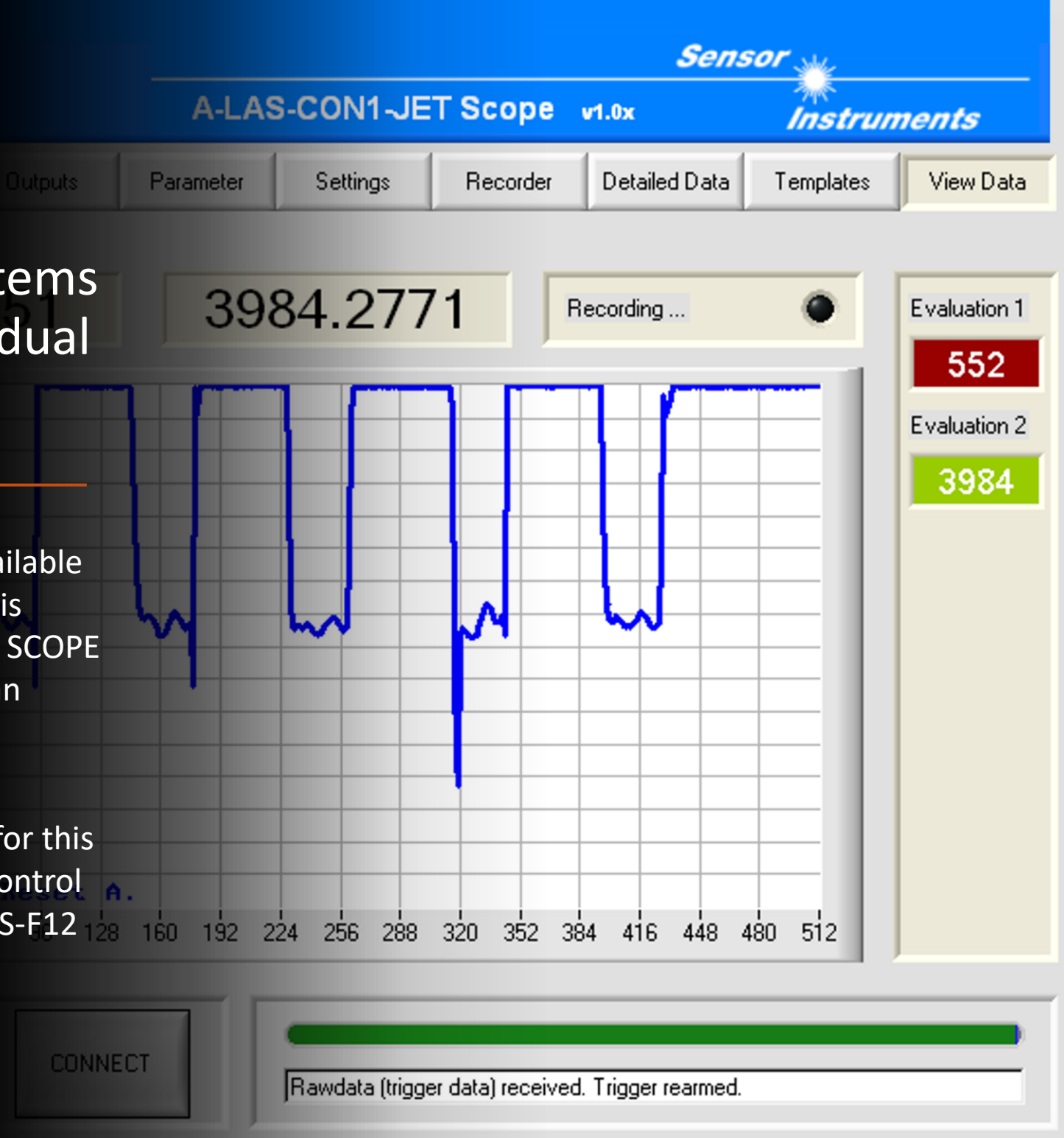
The task of the spray jet control system is to monitor the amount of spray applied to the carrier material. Firstly, the droplets are counted and secondly, the size of the individual droplets (width and length) is determined using a laser light curtain.



Single-channel inline transmitted light systems for monitoring individual droplets

Extensive PC software is also available for the parameterization with this measuring system. The included SCOPE function can be used to record an image of the droplet sequence, for example.

The measurement system used for this was an A-LAS-CON1 electronic control unit in conjunction with an A-LAS-F12 laser fork light barrier.



Single-channel inline spray jet monitoring in the Ex area using the transmitted light method

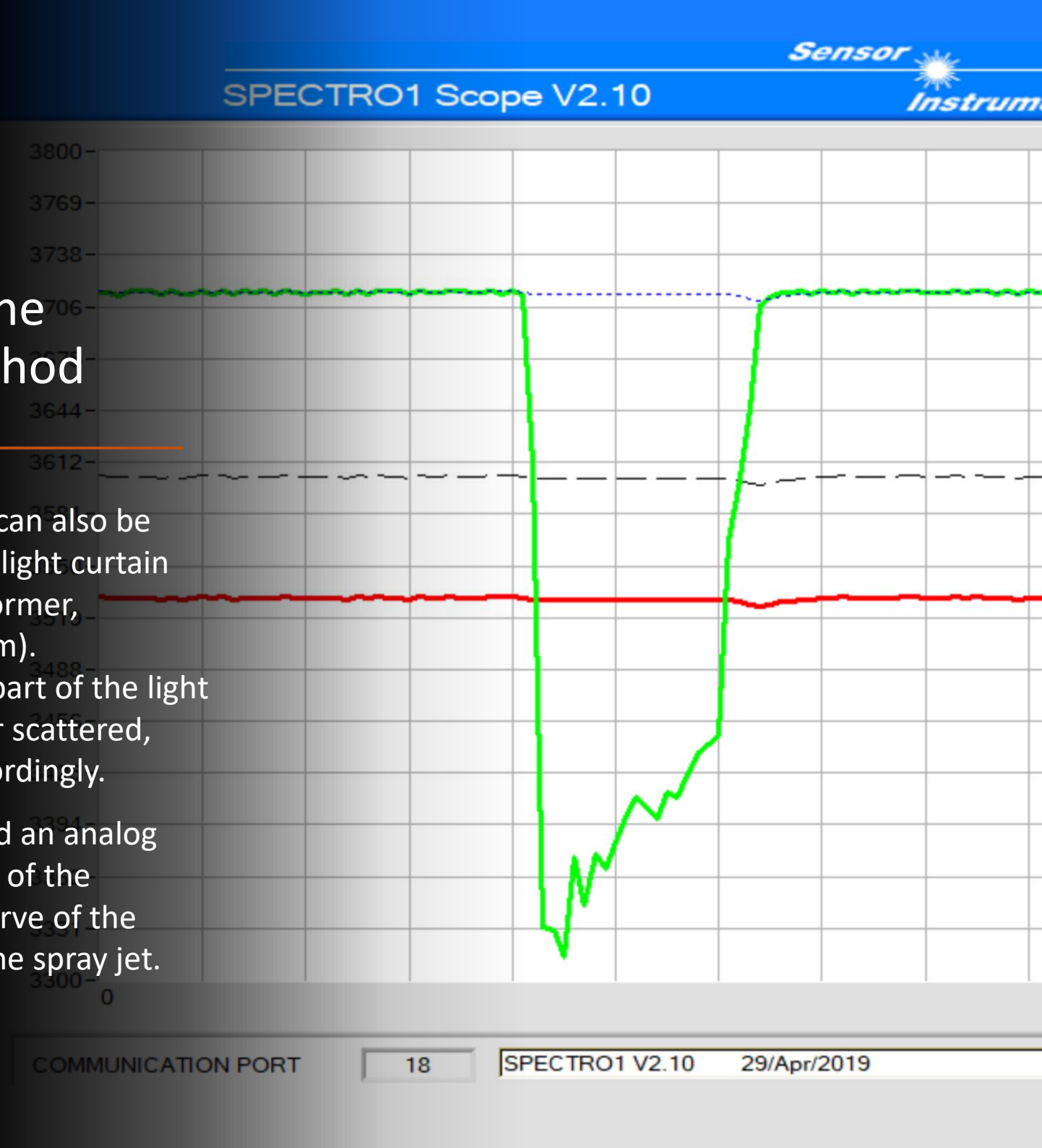
For the Ex area, a fiber optic version is available for spray jet control in transmitted light mode. A so-called transmitted light fiber optics, for example a D-S-Q3-(18x0.3)-1200-67°, is connected to an electronic control unit of the type SPECTRO-1-FIO-JC.

In principle, fiber optic cross-sections with a diameter of 0.6mm to 3.0mm or a rectangular cross-section of 3.0mm x 0.5mm to 48mm x 0.15mm can be used. Attachment optics are available for the vast majority of fiber optics, which can be used to increase the distance between the transmitting and receiving optical fibers.

Single-channel inline spray jet monitoring in the Ex area using the transmitted light method

Relatively extended spray cones can also be monitored with a corresponding light curtain provided by cross-section transformer, for example a Q3 (18mm x 0.3mm). When the spray jet is activated, part of the light in the light curtain is absorbed or scattered, reducing the received signal accordingly.

Both digital signals (0V/+24V) and an analog signal are available at the output of the electronics, which reflects the curve of the signal attenuation triggered by the spray jet.



Three-channel inline spray jet monitoring systems in transmitted light mode

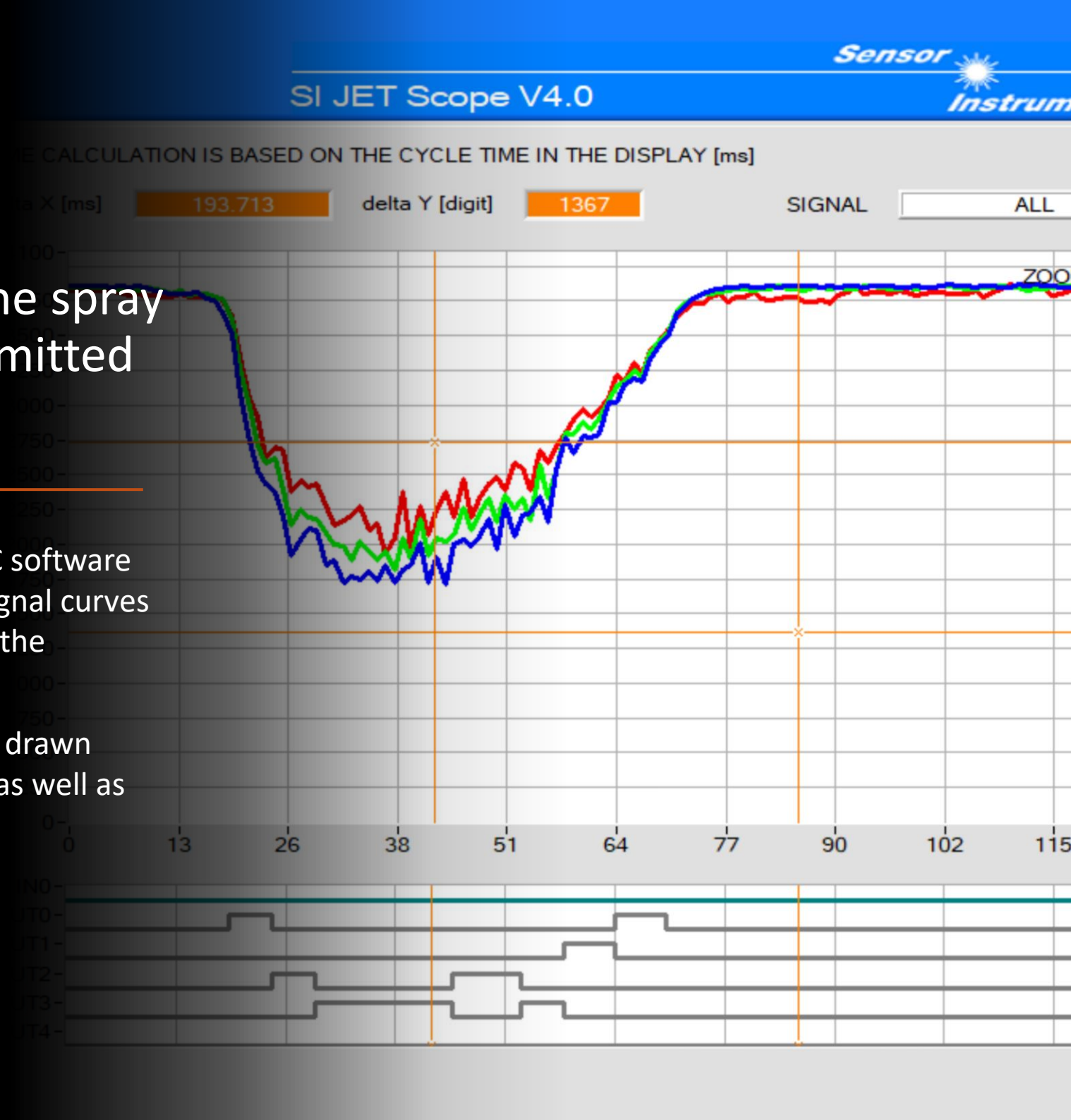
For additional control of the spray cone with regard to the geometry, for example the spray cone opening angle or the deviation from the ideal symmetry axis, at least three points in the spray cone must generally be monitored.

The compact laser spray control system SI-JET-CONLAS3-T-d1.5 (transmitter unit) + SI-JET-CONLAS3-R (receiver unit and evaluation electronics) has three collimated laser light beams that can detect spray cones even with a small opening angle in the tightest of spaces.

Three-channel inline spray jet control in transmitted light mode

The SCOPE function in the PC software can be used to analyze the signal curves of the three channels due to the influence of the spray jet.

This allows conclusions to be drawn about the spray jet intensity as well as the spray jet geometry.



Three-channel inline spray jet monitoring in the Ex area using the transmitted light method

A fiber optic arrangement is provided to implement the three-channel spray jet control in the Ex area. Red light is fed in on the transmitter side via three fiber optics strands.

Three fiber optics strands are also available on the receiver side, each of which is directed to an optoelectronic receiver.

Again, the attachment optics are used to increase the transmitter/receiver distance, with which the light beams can be collimated or focused accordingly.

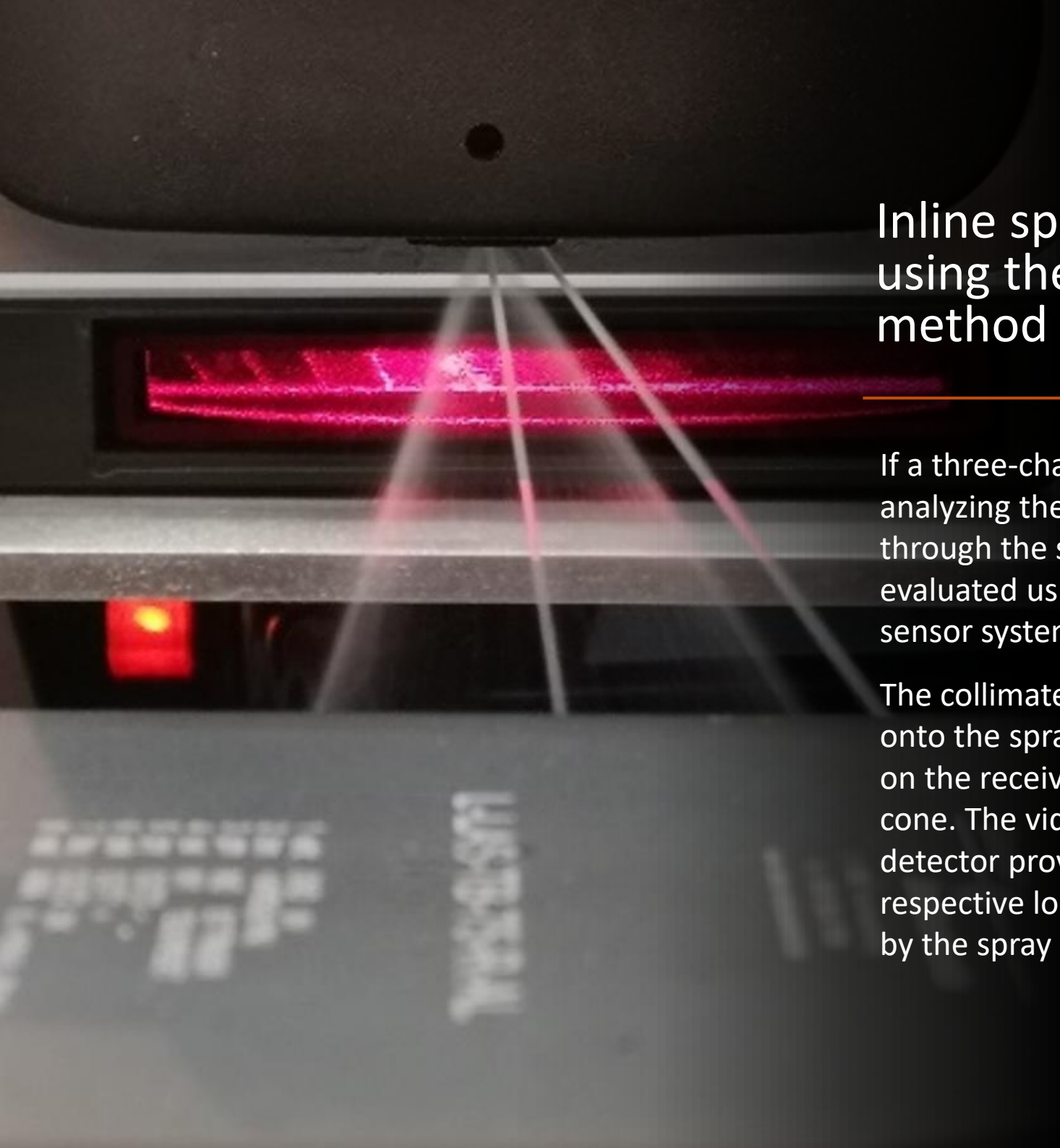
Three-channel inline spray jet control in the Ex area using the transmitted light method

If the attachment optics are selected appropriately, several spray cones can be detected simultaneously.
The received signals provide information about the signal attenuation in total.
However, if one of the spray jets deviates from the normal state, this can still be reliably detected by the electronic control unit.

SI-JET3-FIO-RL + for example:

R3-M-A1.1-(1.5)-3000-67°-3X + KL-M18-A1.1 + ABL-M18-5-B

R3-M-A2.0-(2.5)-3000-67°-3X + KL-M18-A2.0 + ABL-M18-5-B



Inline spray jet profile sensors using the transmitted light method

If a three-channel system ist not sufficient for analyzing the spray jet, a complete section through the spray cone can be laid and evaluated using a laser line through-beam sensor system.

The collimated laser light curtain directed onto the spray jet hits a line detector element on the receiver side after passing the spray cone. The video signal provided by the line detector provides information about the respective local attenuation of the laser light by the spray cone.

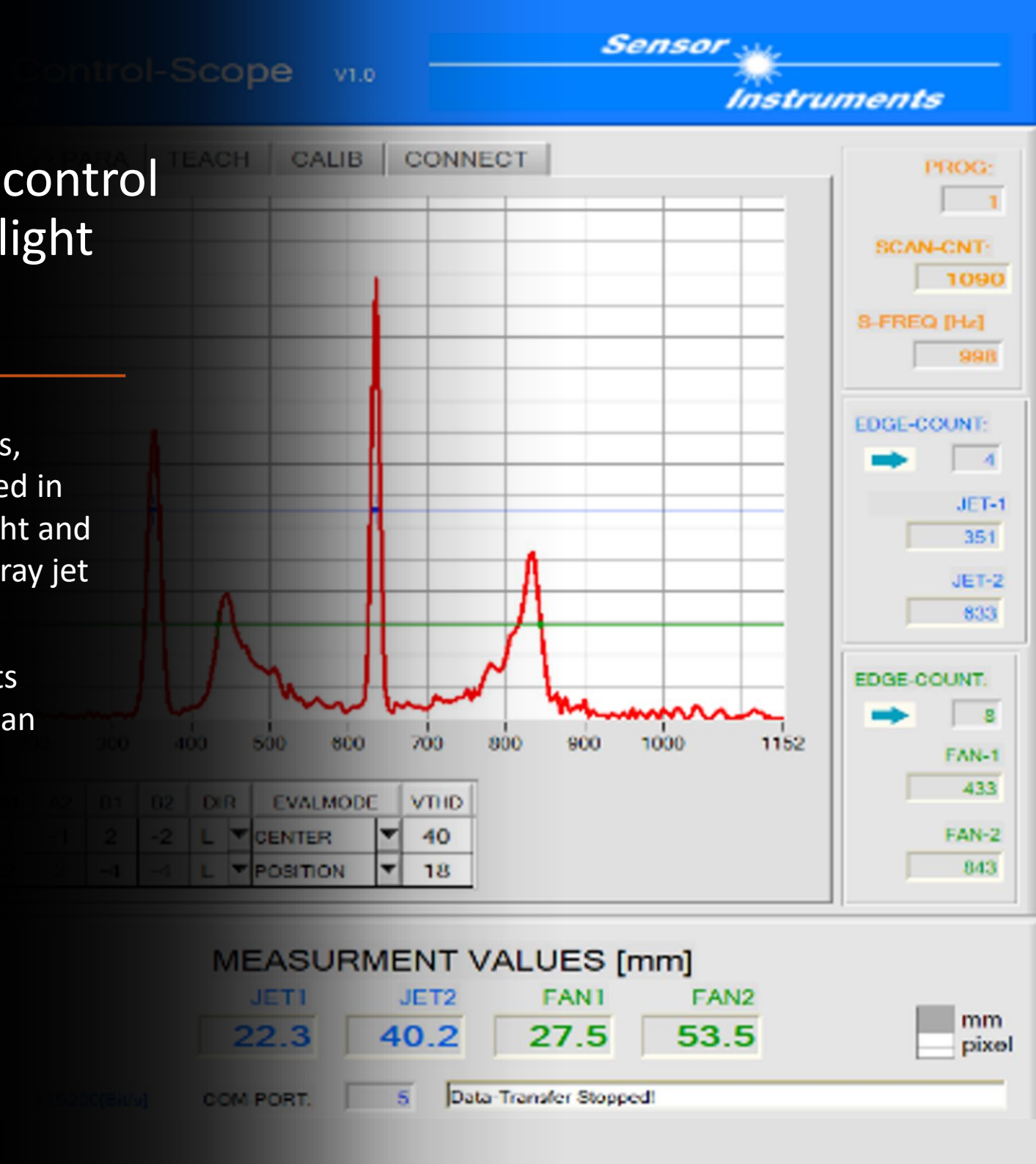
Inline spray jet profile control using the transmitted light method

With the help of special algorithms, individual spray jets can be localized in the spray field and their peak height and exact position in relation to the spray jet profile can be determined.

If a simple spray cone is present, its symmetry and spray jet intensity can also be precisely determined.

Sensor type for example:

L-LAS-TB-100-T-AL-SC +
L-LAS-TB-100-R-AL-SC



Clarity about the Spray Jet Profile

Detect the Spray Jet and Determine its Direction

Maintain control over the consistent spraying process

Our specialists are happy to tell you more about it

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