Software
Why use Monitoring Station Software?
The rising popularity of online sensors means that ever increasing amounts of data are collected. Online results increase the understanding of water quality, but the amount of data can be so enormous that it is impossible to manually verify and interpret the data. Automatic validation and event detection is therefore crucial to exploit the potential of online monitoring.

What is special about moni::tool?
s::can has developed a modular software package to improve data availability and quality. The concept looks at the whole system: hardware, software and operator. Only this all enveloping approach can guarantee that operational control and / or event detection work reliably. Using raw, unvalidated information for control or event detection will result in a high false alarm rate or in poor sensitivity.

The Modular Approach:
The s::can software package for water quality monitoring is split into three modules:

- moni::tool™ - Sensor and Station Management
  Provides management of probes and stations. It documents critical manipulations, from user login to maintenance and logbook keeping. It also has intuitive visualization tools to display all information in a clear and easy to understand format.

- vali::tool - Data Validation
  Automatically detects, marks and (optionally) corrects untrustworthy data. It ensures only high quality data are fed into the event detection module. It also provides the user with indications on sensor maintenance requirements, as well as automatic detection of malfunctions.

- ana::tool - Event Detection
  With ana::tool your existing simple water quality monitoring station morphs into a fail-safe EDS-system!
Sensor and Station Management

moni::tool™ is a revolutionary new platform for the management of an almost unlimited number of stations, online probes, analyzers and parameters. Intuitive operation - on site or remote - and reams of valuable features make moni::tool™ essential for state of the art sensor and station management.

**moni::tool™ - Basic Features**

- Management for an almost unlimited number of stations, probes and parameters
- Automatic installation of all s::can probes
- Open platform talks to any probe type (analog 0/4-20 mA, MODBUS RTU/TCP, solid state), ideal to bring quality into your existing monitoring stations
- Impressive real-time zoomable, scrollable graphical visualization of all historical data including 3D-optical spectra
- Optimal display readability with Classic-, Day- and Night-Mode
- Smart-phone-style, easy to use touch interface allows intuitive operation of sensor and station by non-expert staff
- Minimal user input necessary, Few input options = few input mistakes
- User management: Basic / Advanced / Expert user level
- Quality controlled and documented status management of probes and stations eliminates the need for paper log books
- Station and probe management for 100% transparent documentation
- Can be used in a small monitoring station as well as in the heart of a large central data collection system
- Large local database for collection and management of all incoming data
- Can be run from any standard web browser e.g. via PC, Tablet, Notebook or Smart Phone

**Want to try moni::tool?**
... visit  monitool.s-can.at!

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moni::tool™ - Additional Features

Automatic File Transfer

Automatic File Transfer of all relevant measurements and results to ASCII format
- Customizable format data transfer + ASCII
- Import to any spreadsheet application (e.g. Excel)
- SSH-Transfer, FTP-Transfer and TML-Interface (XML-Based)

Free Formula

Allows the creation of virtual parameters out of the measurement results from other parameters with a custom “free formula”
- Unlimited number of virtual parameters (limited only by type of moni::tool license)
- Possible usage of any parameter monitored (read value or corrected value) and also of single wavelengths from the spectral fingerprint
- An extensive range of mathematical operations can be performed, from basic arithmetics to higher mathematics (sin, log, exp, max, min and many more)
- The virtual parameters are treated like every other parameter (available in time series, can be exported, ...)

Virtual Parameter

Send a SMS in case a configurable condition occurs. (This function uses the con::cube internal modem)
- Every digital output function can be used to trigger a SMS notification. Example conditions could be: The value of a parameter exceeds a set value or an event was detected
- The text of the SMS messages can be freely chosen

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moni::tool™ - Additional Features

**Auto Sampler**

Create your own Auto-Sampler!

- Complete and flexible sample system for up to 4 bottles despite less components
- Configurable conditions for taking samples
- Possibility to combine different conditions and to use delays
- Filling can be controlled either by a fill level detector or by setting a timer
- Solenoids & bottles can be ordered from s::can

**PLC Tools**

The PLC basic feature provides additional functionality for the digital outs and allows to use moni::tool & con::cube for process control

- Digital Out function Time Control
- Digital Out function Value Hysteresis downwards
- Digital Out function Pulsing
- Custom Bits: Use up to four digital inputs to add additional information to an analog parameter
- Other PLC functions under development

**Camera Integration**

Connect a webcam to moni::tool and get snapshots and live stream of the site you are monitoring

- Effective surveillance against vandalism
- Snapshot images as well as live stream video possible
- Interval of the snapshot images can be freely customized
- Can be used with INSTAR and AXIS cameras
**Data Validation**

Automatic data validation makes sure that only unmarked, “clean” data are used for further analysis, training and alarms. Any non-event-related deviating data must be identified and marked before feeding them into the following event detection module.

**Why is Data Validation before Event Detection important?**

vali::tool automatically detects, marks and (optionally) corrects untrustworthy data, not by using mean average - it detects outliers, noise and checks for discontinuous data. It ensures only high quality data are fed into the event detection module (ana::tool). It also provides the user with indications on sensor maintenance requirements, as well as automatic detection of malfunctions.

**How does vali::tool work?**

The basic steps in the data validation are: outlier detection, noise detection and check for discontinuous data. The results of the data validation are presented as status information with the respective parameter and sensor. A station status symbol as well as a change in background color in the parameter display indicate that data quality is sub-optimal. Detailed notifications, including suggestions to remedy the issue or for maintenance, can be called up.

**vali::tool - Highlights**

- Provides self-adaptive, self-controlled data validation in real time
- Ensures both sensitive and reliable alarm limits respectively setpoints for process control
- Analyzes noise, outliers and other combinations in real time to reliably detect any malfunction at an early stage
- Considers user interventions in real-time
- Application-specific training period considers normal fluctuations of individual water matrix and typical process dynamics
- Helps to dramatically reduce false alarm rates
- Configurable auto-correction of data based on threshold, outlier and noise analysis
ana::tool turns your monitoring station into an Event Detection System!

ana::tool identifies unknown and unusual conditions and enables operators to react timely to faults in the monitored system, determines normality of these data and triggers an alarm when a significant deviation from normality is detected.

How does ana::tool work?

ana::tool evaluates measurement data that have been cleaned by the validation module. It identifies unknown and unusual conditions and enables operators to react timely to faults in the monitored system, determines normality of these data and triggers an alarm when a significant deviation from normality is detected. It combines Static Alarms, Dynamic Alarms, Pattern Recognition and Spectral Alarms.

Once an alarm is detected, the user has to provide feedback, so the system can learn what alarms are real and which ones represented normal changes in water quality. This will increase system performance over time. Gradual composition changes (e.g. seasonal variations) are accounted for by automatic training on a moving time window.

ana::tool - Highlights

• Unmatched event detection tools based on proven algorithms for real-time event detection that use data streams from all connected probes separately and in combination
• The only software developed by the market leader to be specifically capable of exploiting the enormous information contained in UV spectra which provide the most sensitive and stable data source for event detection
• ana::tool is optimized for use of multi-dimensional spectral data, but will also work with single or multiple one-dimensional inputs

• So far the only one commercial software package that was tested and found suitable by US-EPA water security division
• All event information is automatically aggregated into a “traffic light” output and a “% deviation from normal” output. Furthermore, analogue and digital outputs as well as text notifications can be triggered
• Trains itself on any type of data streams coming in, and will learn automatically which data are useful for event detection, and which ones not
### moni::tool V2.0 License Options

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* The basic features for 4 parameters come free with every con::cube terminal

### Upgrade
- S-19-subscription: s::can annual upgrade package for moni::tool
- S-19-premium-subscription: s::can annual premium upgrade package for moni::too; remote updates and yearly upgrade, log file analysis and basic report by s::can Support included (online access required, for end-users only)

### Services

#### data::care packages
- S-18-data-4: data::care - quarterly data check and basic report (annual fee, online access required)
- S-18-data-12: data::care - monthly data check and basic report (annual fee, online access required)
- S-18-data-52: data::care - weekly data check and basic report (annual fee, online access required)
- S-VPN-hosting: vpn::host - one year secure remote access from customer PC to con::cube via s::can VPN server

#### custom packages
- S-12-custom-tab: Custom moni::tool TAB, individual screen within moni::tool, completely adapted to customers requirements and applications, price on request after exact specification
- S-12-custom-formula: Custom formula, individual sophisticated mathematical formulas and algorithms, price on request after exact specification

#### setup+training packages
- A-vf?: vali::tool - setup & evaluation
- A-af?: ana::tool - training & evaluation

### PC software
- S-03-CD: ana::pro advanced process software CD-ROM, software optimized for operation via PC / notebook