

Q-DAS PRODUCTS AND SERVICES



CONVINCING ARGUMENTS

Evaluation in line with standards and guidelines

Developing the Q-DAS ASCII transfer format and industry standard AQDEF, we have the authority of data format

Hands-on transfer of knowledge based on experience and expertise

Q-DAS converter interfaces ensure readability of foreign formats

Exchange of information with third-party systems (CAQ, MES, SAP)

Q-DAS products are established as a global standard

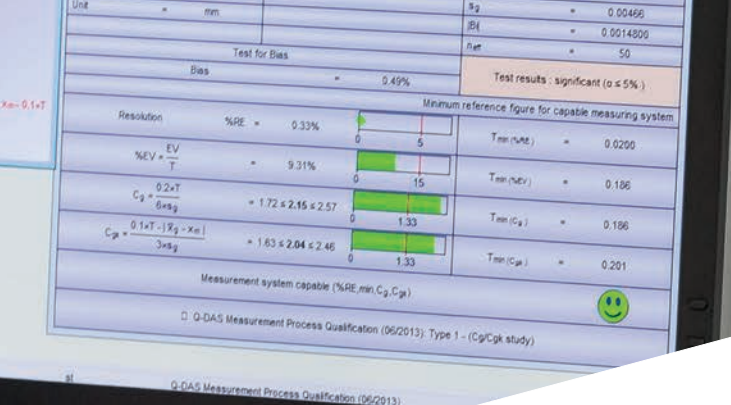
Statistical expertise due to our involvement in the creation of guidelines, standards and reference manuals

Variety of interfaces for a direct connection to many measuring instruments

International partner network offers worldwide customer support

Statistical software products available in 22 languages

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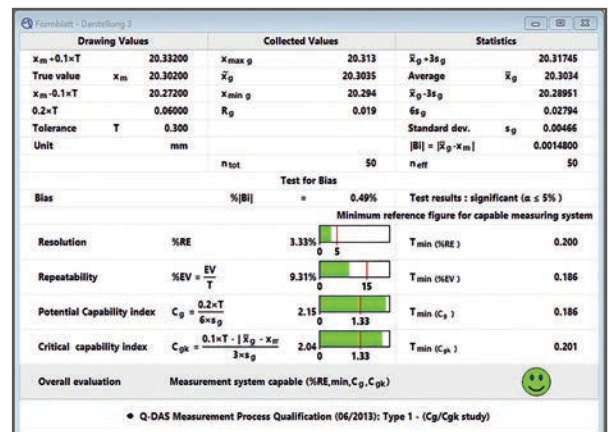
solara.MP[®]

MEASUREMENT PROCESS CAPABILITY

To avoid misinterpretations of process data, the recorded measured values have to be reliable reflecting the real conditions, i. e. measurement processes have to be capable of performing the required task in the respective situation. solara.MP is the perfect choice to establish measurement process capability.

CAPABILITY ANALYSIS ACCORDING TO MSA

Capability analyses establish measurement system capability. The automotive industry created corporate guidelines to specify these analyses in detail and to implement them in practice. solara.MP encompasses many of these guidelines, even the procedures given in the MSA manual of AIAG's Core Tools. The main differences between generally accepted procedures such as type-1 (C_g/C_{gk}), type-2 and type-3 studies (%GRR) or linearity and stability analyses are in the applied calculation methods and the respective limits.



APPEALING GRAPHICS, CONVINCING STATISTICS AND DETAILED REPORTS

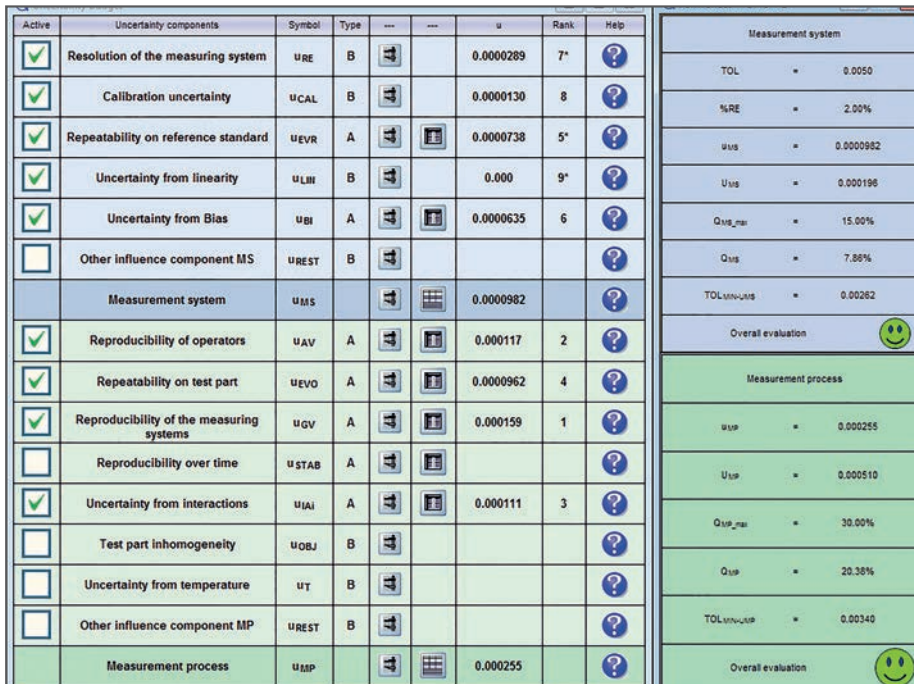
solara.MP offers a broad variety of graphics users apply as a visual support to interpret the statistics they calculated. Users may customise any available graphic for a quick and professional overview of measurement process capability.

Reports provide users with a concise and appealing overview of statistics and graphics. These reports frequently document measurement process capability. They can be stored as PDF files or sent as an email attachment. Reports used as graphic files are easy to integrate into third-party systems.



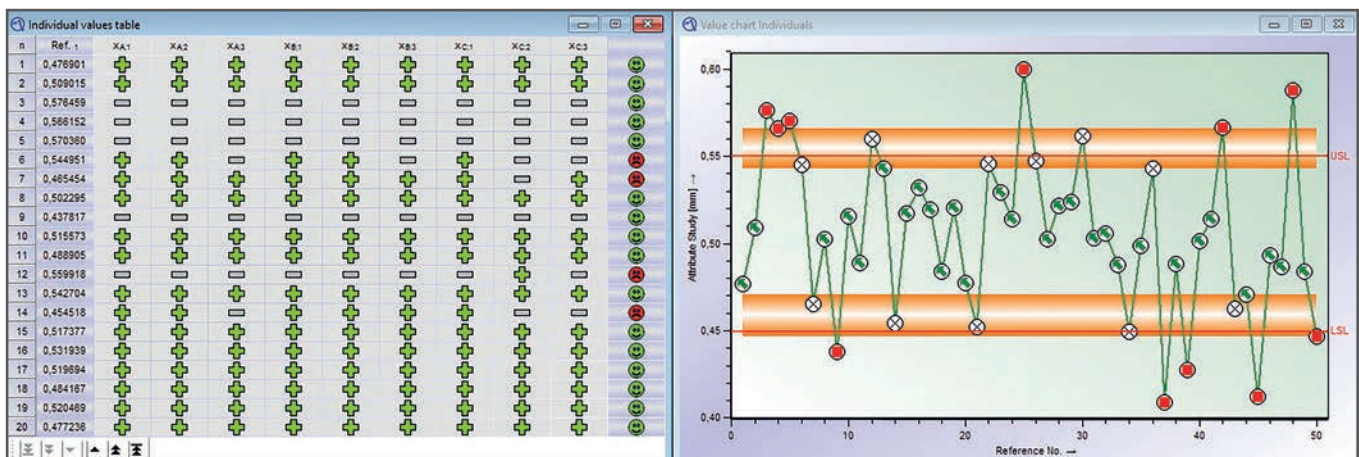
MEASUREMENT PROCESS CAPABILITY ACCORDING TO VDA 5

VDA Volume 5 evaluates measurement processes based on measurement uncertainty. The calculation of measurement uncertainty is based on an approach that is quite as pragmatic as MSA capability analyses; however, it follows the specifications of GUM (Guide to the expression of uncertainty in measurement) or EN V 13005. solara.MP combines uncertainty components in an uncertainty budget and calculates the expanded measurement uncertainty U. Providing evidence for conformity or nonconformity with specification according to ISO 14253, users are able to consider the estimated measurement uncertainty.



ATTRIBUTE MEASUREMENT SYSTEM ANALYSIS

The signal detection approach is designed to compare attribute values to reference values. Without any reference values available, the Bowker test determines whether users achieve comparable results. Type-7 study based on Fleiss' kappa or Cohen's kappa evaluates classified values ("ordinal" characteristics).





qs-STAT® PROCESS QUALIFICATION

qs-STAT is the tool of choice for the assessment and continuous improvement of processes in industrial production. The standards and guidelines included provide necessary orientation.

TRUST IN THE RELIABILITY OF RESULTS

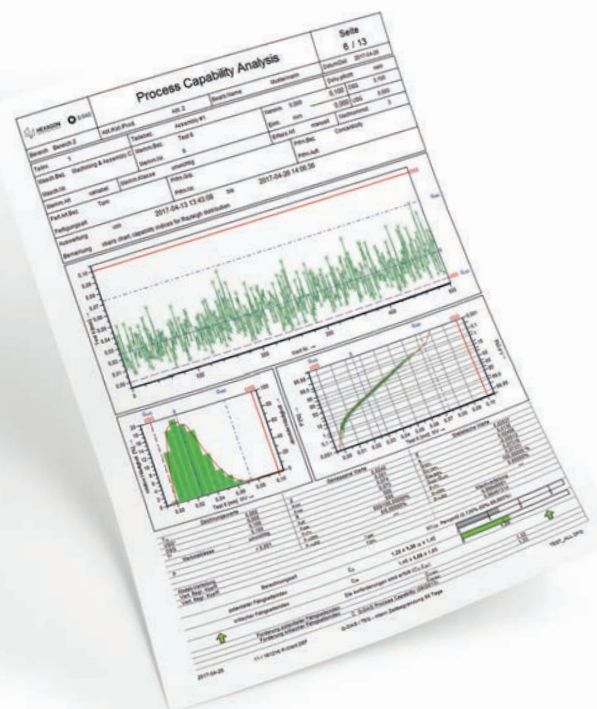
There are different requirements and methods regarding the calculation of statistics like C_p and C_{pk} values. All of them are either based on standards, association and corporate guidelines (e.g. BMW, GMPT, Robert Bosch and Volkswagen) or an individual approach. The evaluation strategy defines all the specifications required to calculate statistics. At the heart of Q-DAS software products, this strategy guarantees the reproducibility of results.



- Applying the integrated evaluation strategy, users always follow the correct approach to the calculation of statistics.
- Results become comparable, reliable and can be validated.
- A company-specific evaluation strategy helps users meet individual requirements.

REPORTS

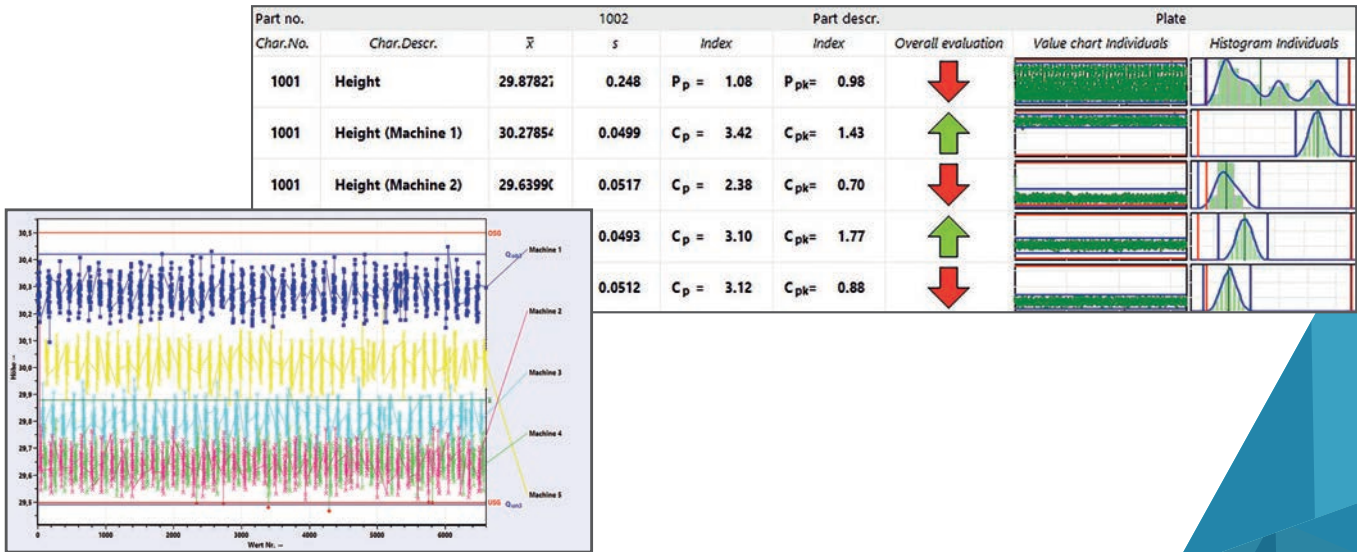
Reports provide users with a concise and appealing overview of statistics and graphics. These reports frequently document measurement process capability. They can be stored as PDF files or sent as an email attachment. Reports used as graphic files are easy to integrate into third-party systems.



qs-STAT DRIVES KNOWLEDGE ACQUISITION

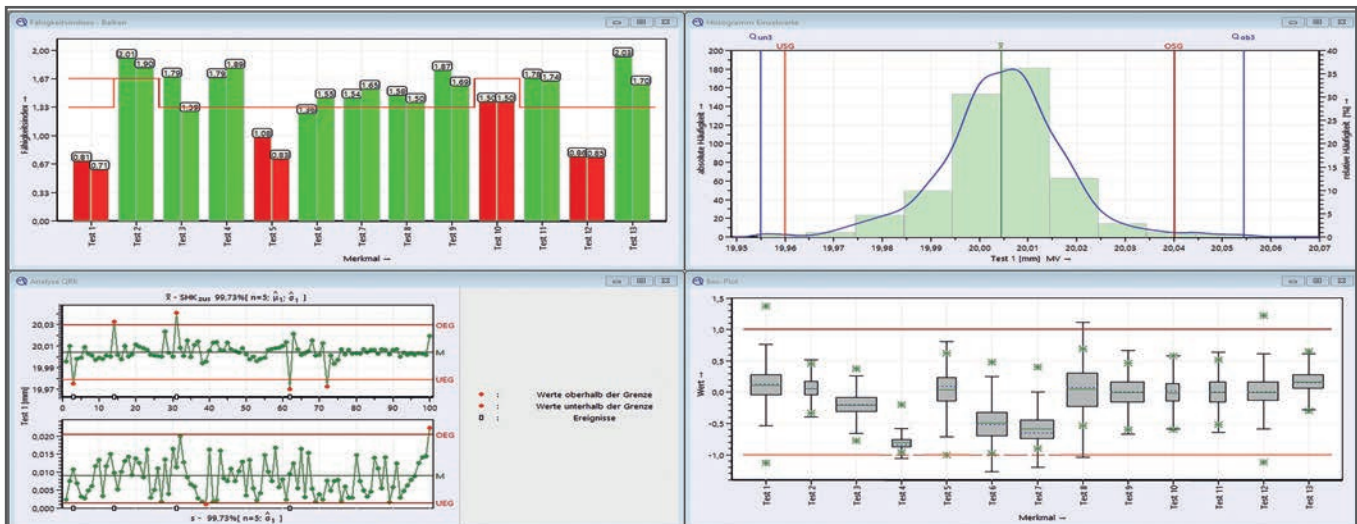
qs-STAT is recognised as a secure means for establishing machine performance and process capability. Different filters and selection criteria detect trends and deviations. The analyses frequently allow users to reach conclusions about significant influences caused by different factors like machine, batch, operator, tool, temperature, etc.

qs-STAT provides an essential tool for illustrating influences in appealing graphics and for evaluating them to identify room for improvement. The knowledge acquired leads to substantial process improvements and reduces process costs.



GRAPHICS AND STATISTICS

There are numerous statistical procedures available identifying the best suitable distribution time model automatically and assigning the data to the respective process model as given in ISO 21747-2. qs-STAT also provides users with a rich set of statistical summary graphics and graphics of individuals for the visual evaluation of processes.





destra[®]/vidara[®] DESIGN OF EXPERIMENTS

Offering a variety of statistical methods and tests, destra and vidara are the tools for process improvement. Users benefit from an intuitive user interface and appealing graphics for a quick interpretation of evaluation results.



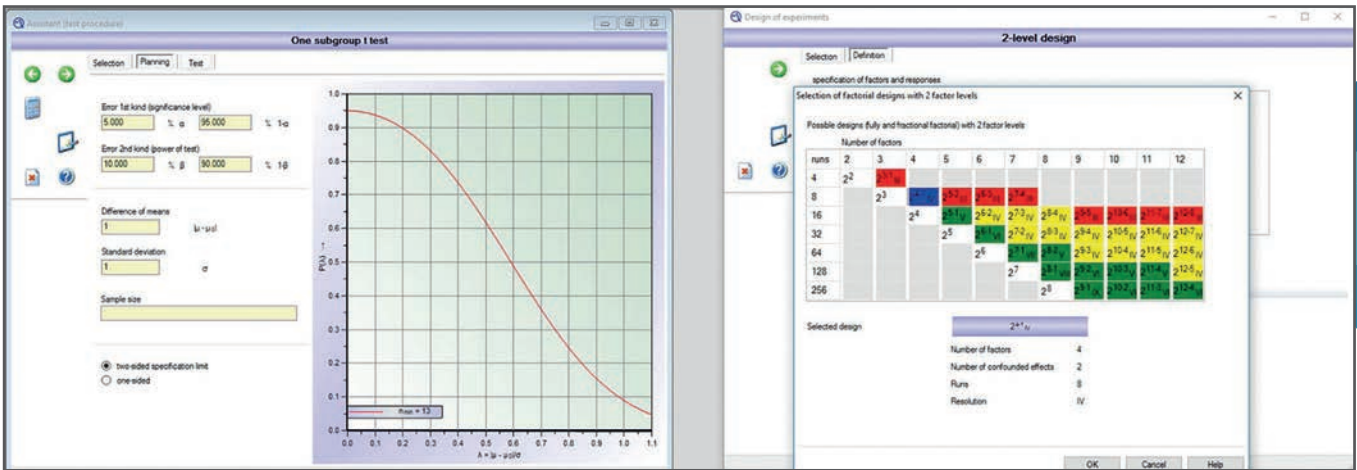
destra is the tool for in-depth data analysis required in corporate acceptance or new development projects. The software's wizard guides users through the evaluation of process data leading to meaningful results. Approved as a classical statistical package, destra is also the tool of choice for process optimisation in Six Sigma projects. Whether Green Belt, Black Belt or Master Black Belt, the software offers simple, graphic-assisted evaluation methods but also a broad variety of expert tools.

While destra offers a whole package of statistical tools, vidara is a software solution that can be combined with solara.MP and qs-STAT to offer the same range of functions yet including all available configuration options. vidara is thus designed for users of qs-STAT and solara.MP looking for a reasonable extension including evaluation options with respect to improvement projects.

DESIGN OF EXPERIMENTS

Design of experiments analyses cause-and-effect relations between factors and responses and optimises products and processes. A well-structured acquisition of data plays a major role.

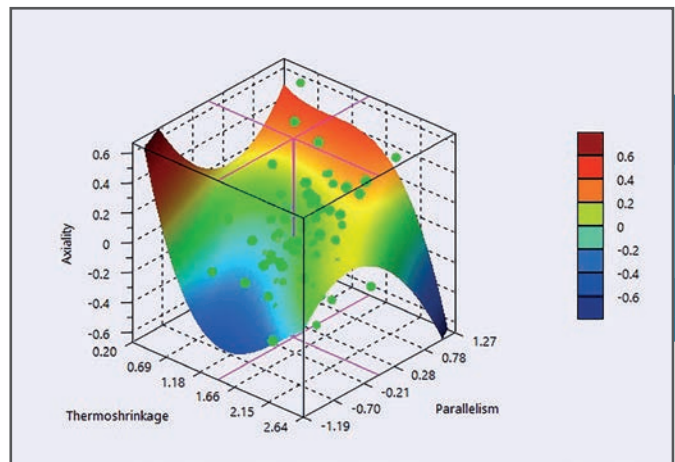
- Intuitive user interface to create individual experimental designs
- Appealing and significant graphics of results
- Optimisation of several responses



ANALYSIS OF VARIANCE AND REGRESSION

The analysis of variance and regression supports users in adapting mathematical models to cause-and-effect relations between factors and responses.

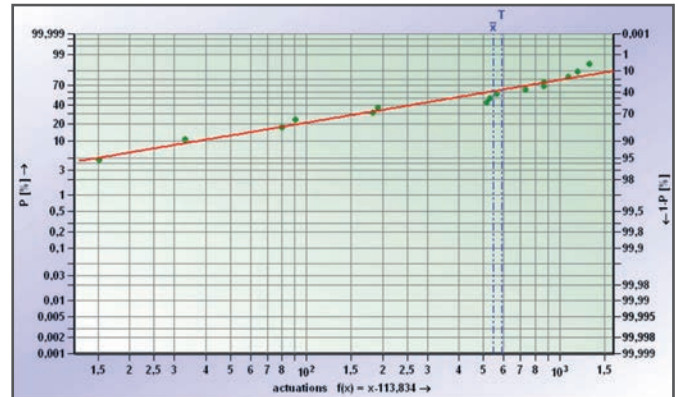
- Excellent model designs
- Various designs for analysis of variance
- Formula editor
- Mixed effects
- Hierarchically nested models
- Unbalanced data
- Visual model diagnostics



RELIABILITY ANALYSIS

Reliability analyses check whether a product meets its requirements under specific conditions over time. vidara helps users plan lifetime analyses, evaluates data collected in an experiment and shows the results in graphics.

- End-of-life test
- Censoring (type I, type II and hybrid censoring schemes)
- Sudden death test
- Eckel procedure for field failure
- End-of-Life-Tests



PROJECT EXPLORER STRUCTURES ANALYSES

The integrated Project Explorer combines analyses made in different modules into compact work packages and structures them. It virtually encloses related data and evaluation results and helps users switch easily and quickly to a different module of the respective project element.

Fid Height (Filar 1)		Fid Height (Filar 2)	
n	s²	n	s²
24	0.355	24	0.158
The variances of the populations are equal			
The variances of the populations are NOT equal			
Test level		critical values	
α = 5 %	0.43	lower	2.31
α = 1 %	0.33	upper	3.04
α = 0.1 %	0.24		4.23
Test results		Test statistics	
Null hypothesis not rejected		s₁²	s₂²
P-Value %		58.28 %	0.79851
Confidence interval		Confidence limit	
1 - α = 95 %	0.345	lower	1.848
1 - α = 99 %	0.283	upper	2.429
1 - α = 99.9 %	0.189		3.380

COMPACT AND CLEAR STRUCTURE OF DATA AND RESULTS

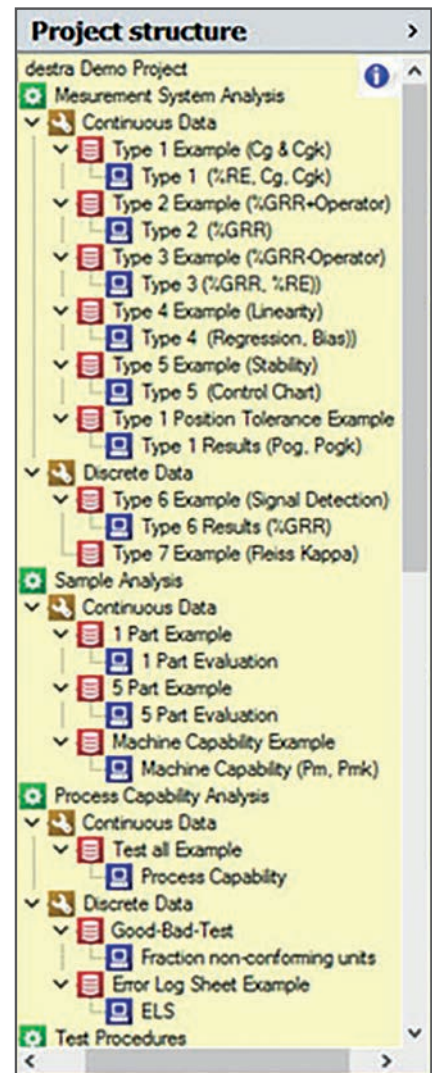
Users create different levels in the project structure. Work packages combine analyses of the same type in each project phase. Users define single sessions for each individual analysis step. These sessions include the data sources to be observed and evaluation methods. Various evaluation graphics and form sheets show the evaluation results of the respective session. The software saves the current status of all data and information to the respective project and users may continue their work at any time.

NAVIGATION THROUGH THE PROJECT EXPLORER

Files available in the AQDEF format can serve as a data source for the single sessions in the project structure.

The program stores any data sources, analysis steps, evaluation results and graphics in a project file. It thus manages all relevant information. Project files facilitate cooperation since users provide the project file to any project staff in order to show them the current status of the project.

The Project Explorer navigates through different project phases and sessions or through available evaluation modules. In case users apply the Project Explorer to switch to a project phase completed in a Q-DAS software product that is not installed on their computer or whose licence is currently blocked by another user, the program switches automatically to the viewer mode. The software now shows the results of the respective project phase/session and thus provides all relevant information. However, users cannot edit the data in the viewer mode.





O-QIS® REAL-TIME VISUALISATION

O-QIS is a tool designed to visualise and evaluate test and process data. There are various ways of generating these data. O-QIS offers the perfect solution to the respective task by providing different modules.

- MCA/CMM Reporting for the evaluation and acceptance of individual measurements referring to historical data
- procella for the manual input of test data or the transfer of data from measuring equipment and multiplexers via serial interface; also available as a stand-alone solution.
- Monitoring for the visualisation of measurement data and process parameters directly from a programmable logic controller (PLC)
- Alert Manager for nearly real-time visualisation of alarms

MCA/CMM REPORTING

The MCA/CMM Reporting module of O-QIS is dedicated to evaluating measured values after a part measurement is completed. The module assumes that the measurement system generates a file containing information about the measured part, its characteristics and current measured values after the measurement is completed.

Typical applications are measurements of coordinate measuring machines. The measuring program and the measurements offer all required information that can be provided as a Q-DAS file. Many manufacturers of measuring instruments support the Q-DAS AQDEF data format.

O-QIS visualises these data directly after their generation and shows them to the operator in configurable summary graphics. The software even includes measured values of previous measurements in the evaluation. Operators immediately detect trends and deviations in the current measurement and decide whether they want to accept or reject the measurement for statistical analysis (e.g. in case of erroneous measurements). They may automatically generate PDF reports or send them as an attachment by email.

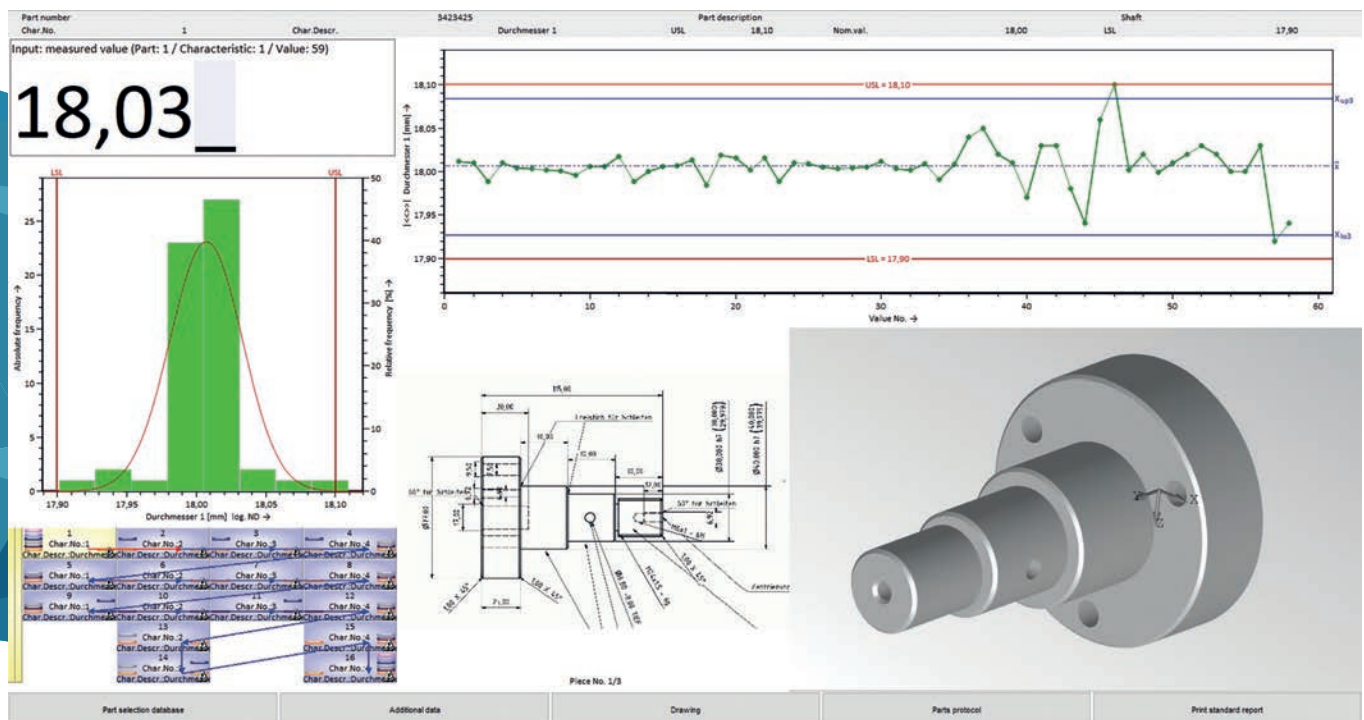


procella

The SPC tool procella collects measurement and test data manually or transfers them directly from various types of measuring equipment via interface. Measuring equipment is either part directly connected to the computer via interface or it transmits data via multiplexer.

Operators first select the test plan of the part to be measured either by choosing it from the list of all test plans or by using a barcode scanner. With a test plan selected, procella shows a graphical user interface for an easy recording and evaluation of measurement and test data. The program guides operators through the part inspection task and indicates any deviations from the test sequence. Operators are able to schedule setup measurements and handle incomplete measurements.

The recording of test data first requires a careful definition of what operators are allowed to do and what they are not. This is what the user management of Q-DAS software products does so that operators can only see and use the predefined input screen mask. This is the reason why operators do not need any training in procella since administrators clearly define the options and liberties available to them. The application of the software thus becomes self-evident.

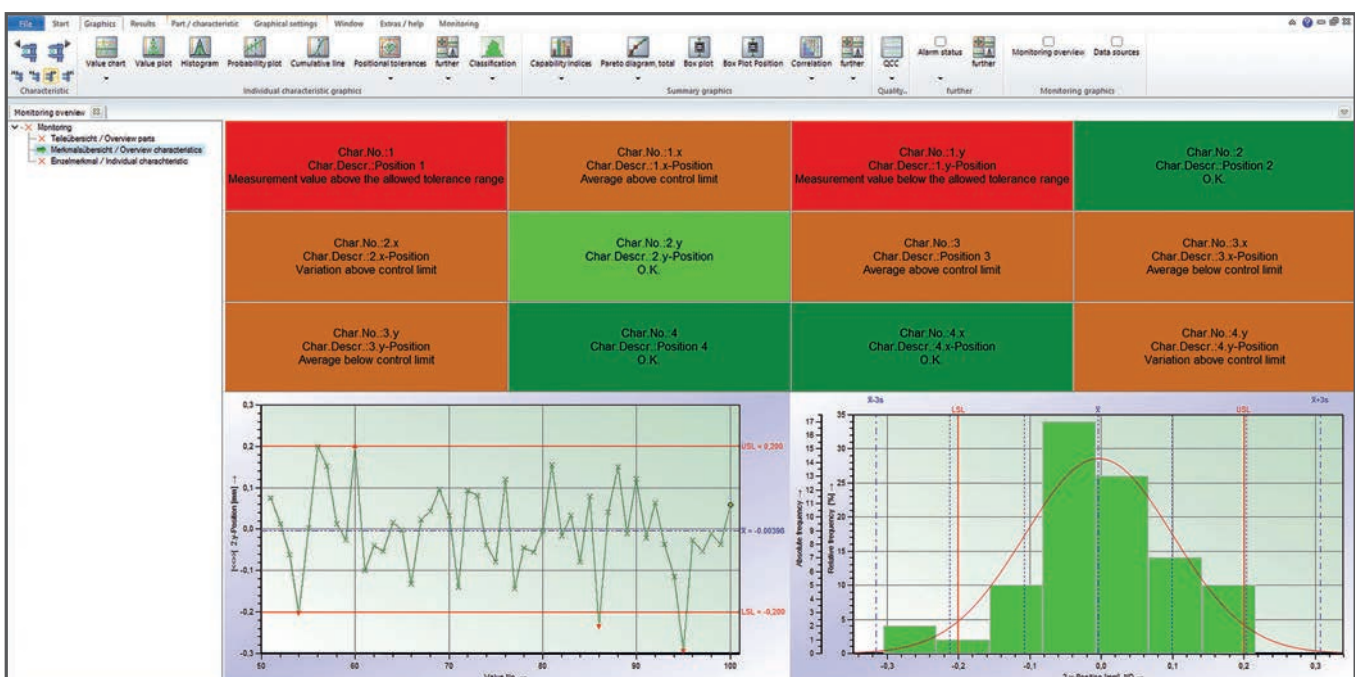


procella offers more than the “one and only” default input screen mask. A flexible design is one of the key benefits of procella. The graphics displayed to the operators are defined during the program’s implementation and configuration. These graphics include value charts, summary graphics and even images, CAD drawings and inspection notes regarding the part or characteristics to be measured. procella visually indicates where and how an operator has to measure the part, even by applying different views.

procella visualises statistical deviations from process specifications in alarm dialogue boxes. Alarms are, for example, violations of tolerance limits or control limits, or violations in quality control charts or trend processes. As soon as an alarm occurs, the operator will be prompted to enter events, causes and measures to identify clusters and record deviations. The application of quality control charts and the observation of control limits in particular maintain process stability.

MONITORING

A typical application of the Monitoring module is the visualisation of measurement and process data provided by a recording system in short time intervals. The recording system provides the data cyclically in the AQDEF format. Monitoring accesses these data and visualises measurement information continuously. The software updates the visualisation of the measurement automatically with each measured value it collects and provides a clear overview even for numerous characteristics. Operators focus on their measurement data or parameters and are able to make prompt decisions when deviations occur. The program even visualises several data sources at a single work station simultaneously. The respective tile turns red when the machine shows deviations. Drill-down functionalities make it easy to identify the characteristics or individual measurement causing the deviation. Monitoring displays alarm notes in different colours depending on the violated type of SPC alarm criterion.



ALERT MANAGER

Various statistical alarms might occur during data recording, from tolerance violations to alarms in quality control charts. The different O-QIS modules are dedicated to showing all of them immediately. Visualising these alarms at a central location, the Alert Manager helps users assess the alarm status of single measuring stations even for extensive or spatially separated shop floor areas.



M-QIS[®]

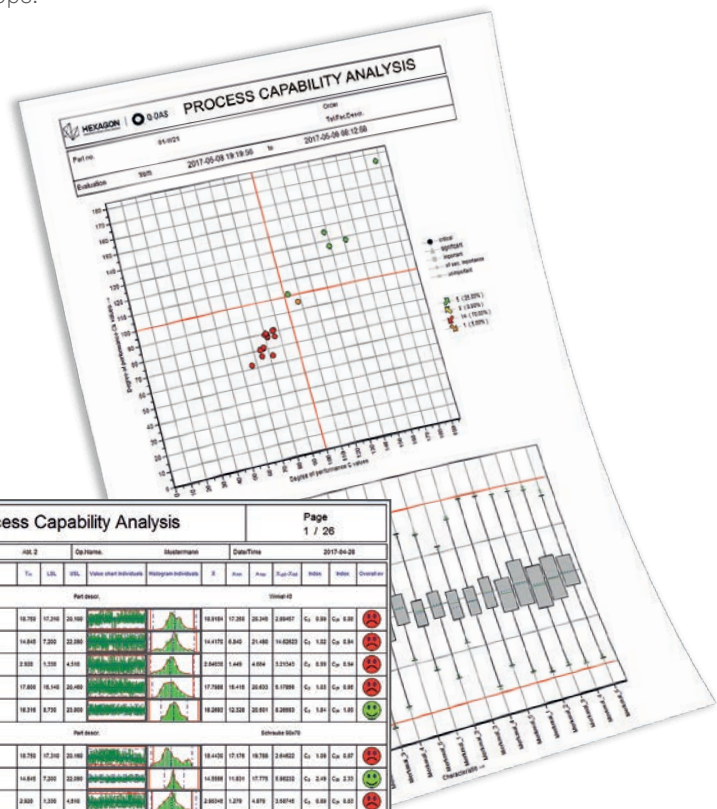
AUTOMATED DATA PROCESSING

Q-DAS statistical software products load data from the database, evaluate them and generate associated reports. M-QIS (Management Quality Information System) automates all these steps.

AUTOMATED GENERATION OF REPORTS

M-QIS Engine automatically loads a predefined data pool from the Q-DAS database. The system evaluates the associated information and provides them in the form of reports. It sends PDF reports as an email attachment to a specified group of recipients or stores them in a directory structure.

Depending on the respective application, the system either always reports the evaluation results of the cyclically analysed data or only if the data do not meet defined process requirements.

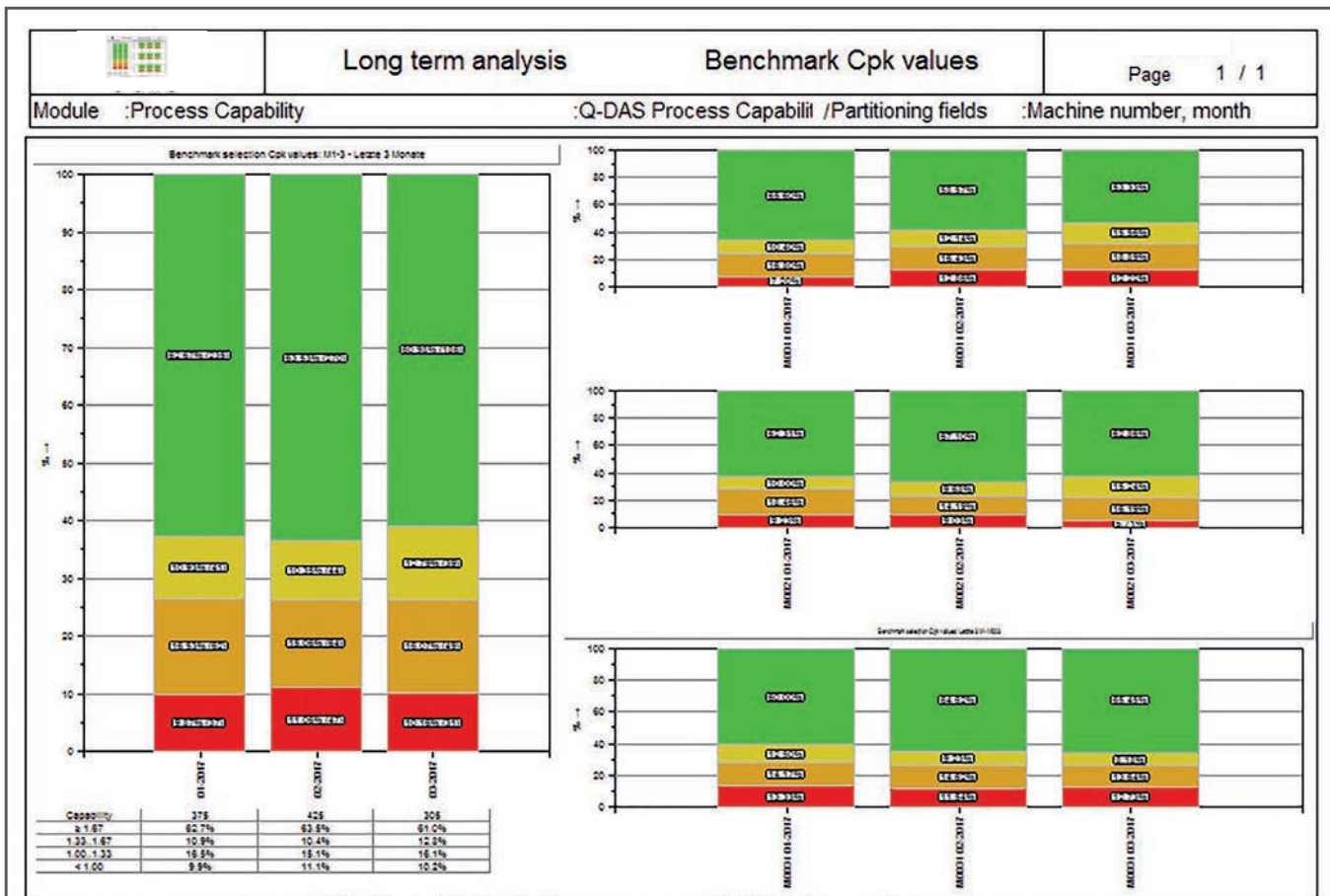


Process Capability Analysis												Page 1 / 26							
Plant	Part no.	Part descr.	Class	Char Descr.	Tc	LSL	USL	Value char. individuals	Histogram individuals	X	S	Min	Max	Part-Tol	Spec. Min	Spec. Max	Index	Overall	
Part no.: 01-021												Date/Time: 2017-06-28							
9	01-021	01000-00	1	SWITCH_1	16.700	17.200	20.700	18.999	17.200	20.700	18.999	17.200	20.700	2.0000	Cu: 0.99	Cp: 0.99	1.00	OK	
9	01-021	01000-00	2	SWITCH_2	14.800	7.200	23.000	14.175	6.800	21.400	14.000	21.400	14.000	21.400	2.0000	Cu: 1.00	Cp: 0.99	1.00	OK
9	01-021	01000-00	3	SWITCH_3	2.000	1.200	4.800	2.000	1.400	4.000	2.000	4.000	2.000	4.000	2.0000	Cu: 0.99	Cp: 0.99	1.00	OK
9	01-021	01000-00	4	SWITCH_4	17.000	16.140	20.400	17.700	16.410	20.400	17.700	20.400	17.700	20.400	2.0000	Cu: 1.00	Cp: 0.99	1.00	OK
9	01-021	01000-00	5	SWITCH_5	16.200	8.700	23.000	16.200	12.500	20.900	16.200	20.900	16.200	20.900	2.0000	Cu: 1.00	Cp: 1.00	1.00	OK
Part no.: 07-000												Date/Time: 2017-06-28							
9	07-000	Schleuse 0000	1	SWITCH_1	16.700	17.200	20.700	16.400	17.070	19.700	16.400	19.700	16.400	19.700	2.0000	Cu: 1.00	Cp: 0.97	1.00	OK
9	07-000	Schleuse 0000	2	SWITCH_2	14.800	7.200	23.000	14.000	6.800	21.400	14.000	21.400	14.000	21.400	2.0000	Cu: 2.00	Cp: 0.99	1.00	OK
9	07-000	Schleuse 0000	3	SWITCH_3	2.000	1.200	4.800	2.000	1.200	4.000	2.000	4.000	2.000	4.000	2.0000	Cu: 0.99	Cp: 0.99	1.00	OK
9	07-000	Schleuse 0000	4	SWITCH_4	17.000	16.140	20.400	17.000	16.140	20.300	17.000	20.300	17.000	20.300	2.0000	Cu: 1.00	Cp: 1.00	1.00	OK
9	07-000	Schleuse 0000	5	SWITCH_5	16.200	8.700	23.000	16.700	12.800	21.000	16.700	21.000	16.700	21.000	2.0000	Cu: 1.00	Cp: 1.00	1.00	OK
Part no.: 07-001												Date/Time: 2017-06-28							
9	07-001	Schleuse 0000	1	SWITCH_1	16.700	17.200	20.700	16.700	17.000	19.800	16.700	19.800	16.700	19.800	2.0000	Cu: 1.00	Cp: 1.00	1.00	OK
9	07-001	Schleuse 0000	2	SWITCH_2	14.800	7.200	23.000	14.000	6.200	20.100	14.000	20.100	14.000	20.100	2.0000	Cu: 1.00	Cp: 1.00	1.00	OK

LONG-TERM ANALYSES BASED ON COMPRESSED RESULTS

M-QIS provides users with the option to calculate process statistics continuously over a long period and to store the results based on individual process information (line, machine, cavity, tool, ...) in the Q-DAS database. It is thus possible to load and process larger amounts of data quickly since the software only accesses statistics that have already been calculated.

An adjustable automatism specifies the time to save these results and the compression criteria the evaluation is based on.



DATA ARCHIVING

Q-ARC (archiving) optimises and keeps the performance of the database daily in use but still accesses historical data in case of need. The tool transfers data automatically from the database to an external storage location at regular intervals to keep the active database lean.



Q-DAS CAMERA[®] CONCEPT

Users may combine all Q-DAS standard statistical software products to introduce and create an efficient performance measurement system. The Q-DAS CAMERA Concept describes an overall concept for quality assessment in industrial production. After a successful implementation, it supports users in performing process analyses in all phases of quality data flow.

The Q-DAS CAMERA Concept does not only consist of Q-DAS software products, but it is closely linked to a range of services supporting companies in introducing, implementing and maintaining this system.

BENEFITS OF THE Q-DAS CAMERA CONCEPT

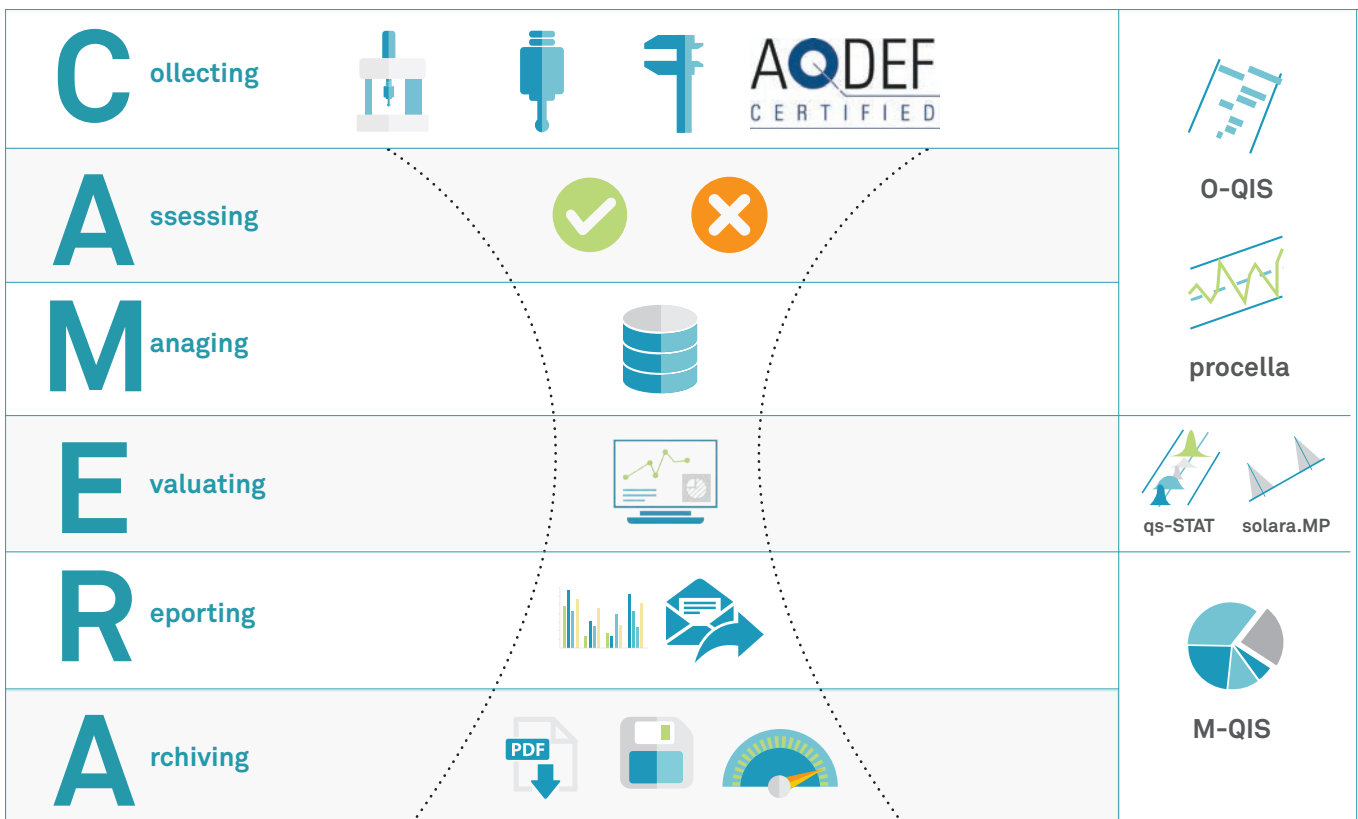
- Standardised interfaces to various systems
- Comprehensive analysis through integration of quality and process data
- Validated statistical evaluation
- Automated evaluation and user-specific display of results
- Modular system
- Standardised implementation processes and extensive implementation experience
- International network for global support on site

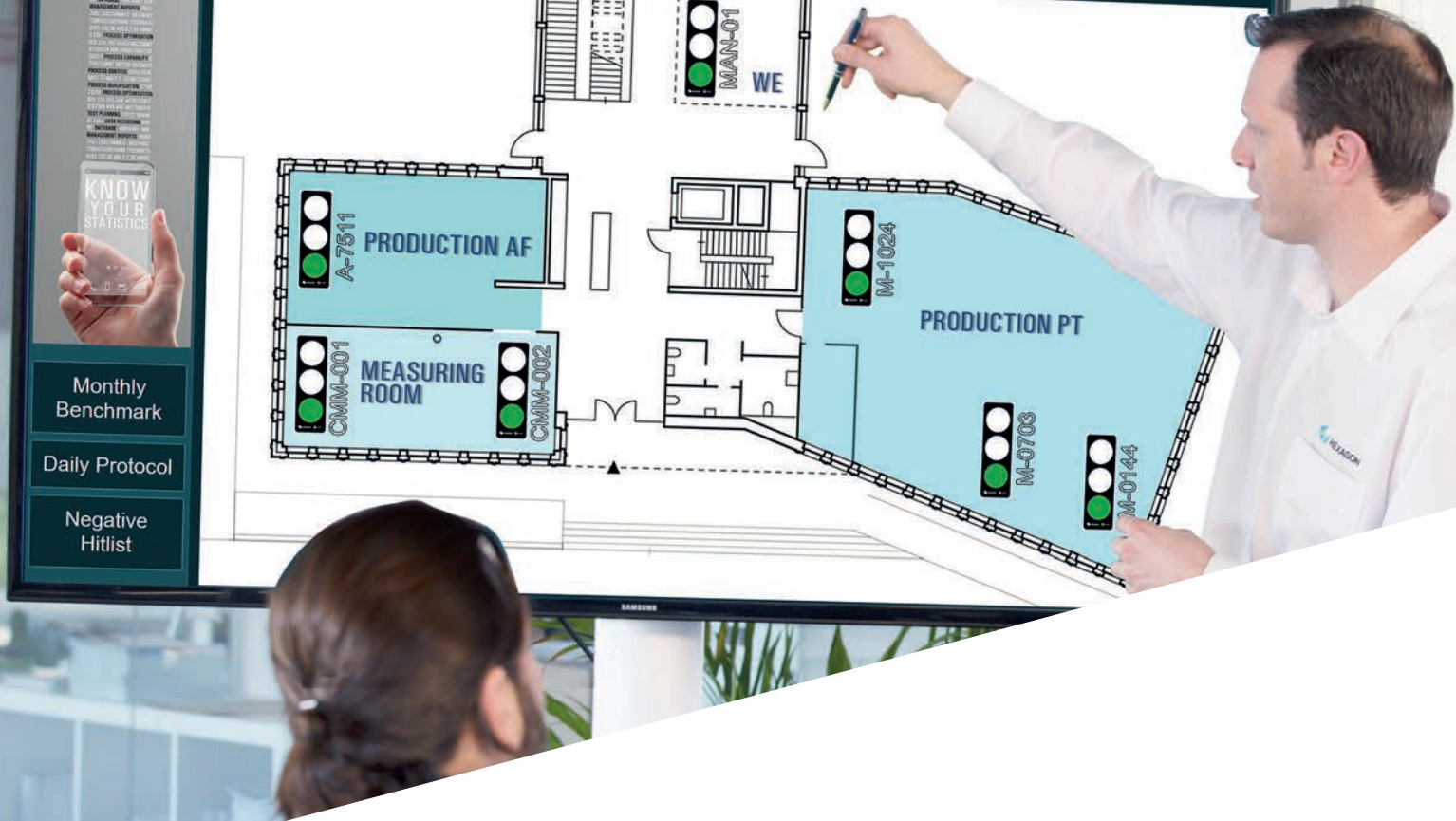
PHASES OF THE Q-DAS CAMERA CONCEPT

The Q-DAS CAMERA Concept consists of different phases in the context of (automated) data recording. The **collecting** phase integrates systems processing quality-relevant data based on the Q-DAS AQDEF data format or via interfaces to measuring instruments, PLC controls or superior systems such as ERP, CAQ, MES etc. The software visualises recorded data in real time and controls them statistically in **assessing**. It immediately informs users as soon as any SPC alarm criterion is violated.

Central data storage and maintenance are key aspects for the management of data in the **managing** phase. The data are subject to automated statistical evaluations according to defined specifications (standard, corporate and association guidelines) in **evaluating**. These specified evaluation strategies form the basis for the reproducibility of results and the supply of information to the planning and management level.

The **reporting** phase of the Q-DAS CAMERA Concept documents these evaluation results. Q-DAS software products show results in manually generated result reports, automatically sent reports, dashboards or at websites etc. The **archiving** phase mainly focuses on applying available mechanisms to make huge amounts of data permanently accessible without any loss of information or performance.





Q-DAS® WEB SOLUTIONS

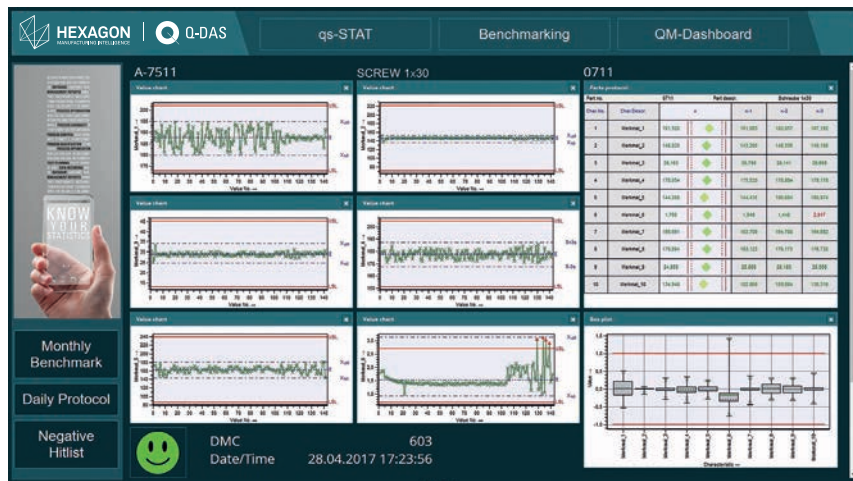
FLEXIBLE DISPLAY OF RESULTS

Q-DAS provides web solutions of some statistical software products that do not have to be installed on a computer but run on an Internet browser. Their flexible use is one of the major benefits of web solutions since their licence is only locked in use.

O-QIS WEB

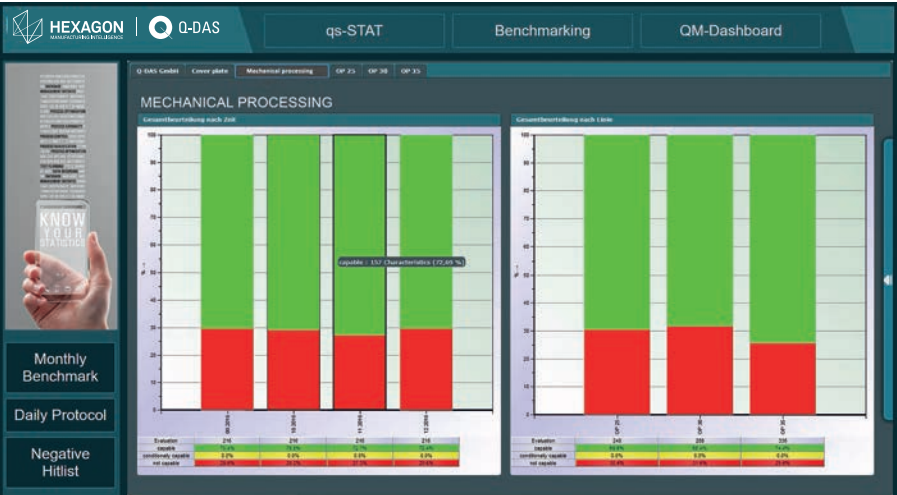
O-QIS Web gives priority to data visualisation. The respective measurement information is already available in the Q-DAS database. O-QIS Web visualises and updates it cyclically benefiting from some database functionalities. The configuration of the single levels and the visual design is also very flexible to design in O-QIS Web.

Example: A manufacturing process includes five machines. The user has to detect each violation of tolerance limits. O-QIS Web displays the hall plan with these five machines. Next to these machines it shows five traffic lights. These traffic lights access the alarms in the Q-DAS database. As soon as an alarm occurs, the light turns red indicating a problem to users of O-QIS Web. Clicking on this light, users get detailed information at the next website, e.g. value charts of the part's characteristics causing the problem. Updating the view cyclically, users always load and visualise current measured values from the database.



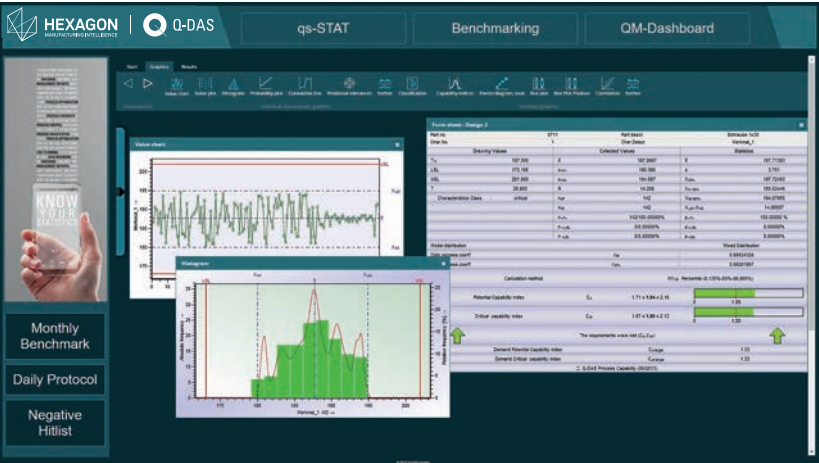
M-QIS WEB

M-QIS Web is the tool of choice for the display of statistics and graphics based on statistical analyses, e.g. compressed information (benchmarks, charts of statistics, etc.). A flexible structure allows for individual configurations based on additional data. However, what does this actually mean? The structure of an analysis reflects reality as closely as possible. As an example, there are three halls, each of these halls accommodates different production lines and each line requires different operations at various stations and applies machines having individual tools. All these levels provide quality information also including the information of lower levels. Users navigate through the displayed graphics top down to identify appropriate measures and room for improvement. The M-QIS Web tool creates and extends the structure of the single websites and generates these sites dynamically according to the defined structure.



qs-STAT Web

Similar to the classical qs-STAT software, it focuses on sample analysis functionalities for machine performance studies and the range of functions required for continuous process capability analysis. Users load the data to be analysed from the Q-DAS database by applying filters and selection criteria. They generate and use statistics, graphics and reports interactively in a web environment.





Q-DM DATAMANAGEMENT

AUTOMATED DATA TRANSFER

The Q-DM Datamanagement transfers files from third-party systems to the Q-DAS database.

The management of data in the database offers a very flexible and task-related selection of data in order to provide different users with the kind of information they need for statistical analyses (e.g. in qs-STAT).

TRANSFER OF DATA

Q-DM is typically installed on a server in the network, sometimes even as a service. It cyclically monitors directories storing Q-DAS files provided by third-party systems. These files contain measurement data, test data and process data. After reading these files, the tool checks the syntax and loads them into the database. This process is based on defined rules users configure in Q-DM. These rules ensure a clear allocation of measurement information in the database.

A project engineer of the Q-DAS System Integration team supports customers in configuring Q-DM during the initial installation of Q-DAS software. The team always considers the IT infrastructure, the data flow and the database system of the respective customer.

Q-DM structures data that have been recorded locally and transfers them to a central data pool.

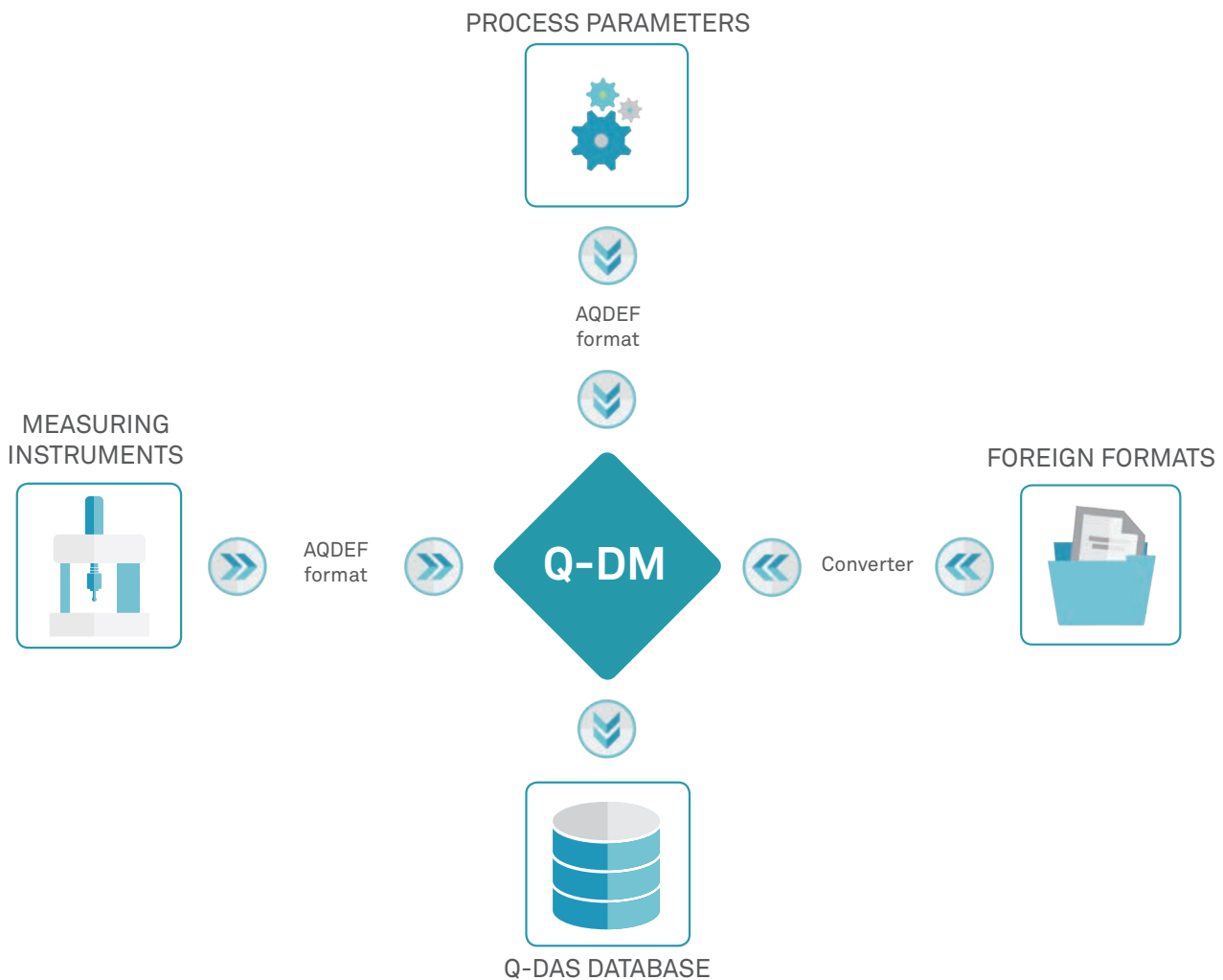
CONFIGURATION OPTIONS

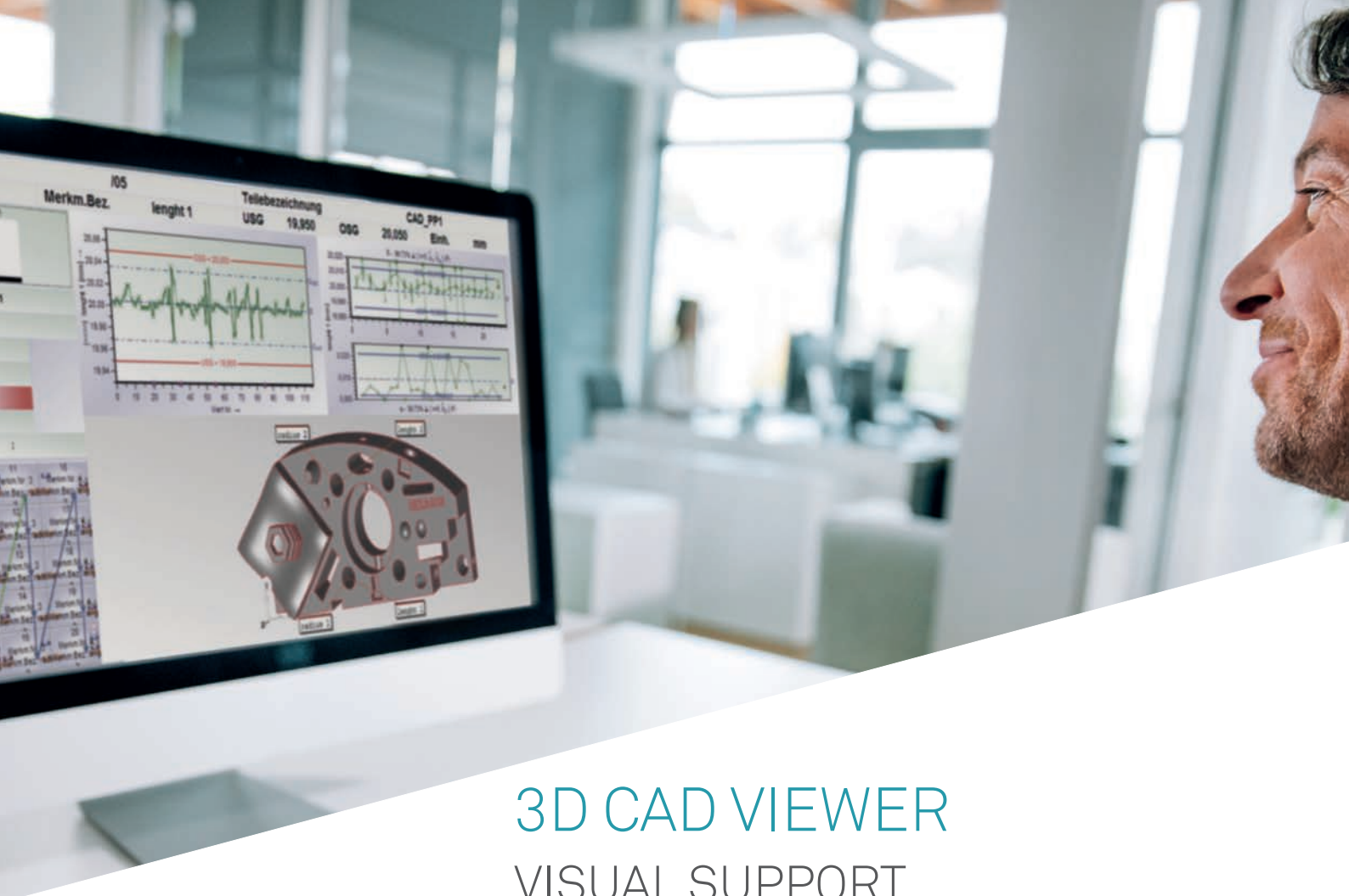
You may adjust a wide range of settings in Q-DM, e.g. how to respond to alarms occurring while loading files in the database and how to store specific information to be considered in subsequent evaluations. The tool is able to generate protocols when a problem occurs while transferring data - e.g. due to a missing network connection or erroneous files - and sends them to system administrators by email. The major task of Q-DM Datamanagement is to guarantee a smooth data flow.

CONVERTER

In case your data are not available in the Q-DAS data format, you may apply a converter in Q-DM. It converts the foreign format into Q-DAS files and loads them in the database. The conversion maps file information from the source file to the Q-DAS (target) file. In addition to the actual file contents, files also provide information about storage location, file name etc.

Developing and configuring a converter is a fee-based service of Q-DAS GmbH. It only applies to the conversion of foreign formats to the Q-DAS format.





3D CAD VIEWER VISUAL SUPPORT

A CAD model specifying product requirements is an essential starting point for many quality processes. CAD models form the basis for the creation of measurement routines for measuring instruments or test plans intended for semi-automated or manual measuring stations recording test data. Additionally, it offers users visual support in performing inspection tasks. The integrated reporting system uses the CAD model to illustrate test and evaluation results.

3D CAD PROVIDING THE BASIS FOR TEST PLANS

Users select and import features interactively into the CAD model for test planning purposes in Q-DAS software products. The import supports established CAD formats (*.igs, *.3DXML, *.stl, *.cad, *.cto, *.CATPart, *.Obj). Functionalities like zooming, rotating or bending the model are designed to facilitate the selection.

If required, users add additional information about features or characteristics, such as specification limits, characteristic classes etc. They may select a different view for each characteristic, e.g. parts of the workpiece or the entire workpiece from a different perspective. The software stores the respective view and links it to the associated characteristic.

Part number	Part description	Characteristic Number	Characteristic Description	Nominal value	Lower Specification Limit	Upper Specification Limit
4712	Demo CAD	1	radius 1	7,500	7,490	7,510
4712	Demo CAD	2	length 1	35,000	34,990	35,010
4712	Demo CAD	3	radius 2	7,500	7,490	7,510
4712	Demo CAD	4	length 2	35,000	34,990	35,010
4712	Demo CAD	5	radius 3	30,250	30,240	30,260
4712	Demo CAD	6	length 3	15,000	14,990	15,010
4712	Demo CAD	7	diameter	12,750	12,690	12,710
4712	Demo CAD	8	radius 4	5,000	4,990	5,010
4712	Demo CAD	9	length 4	30,000	29,990	30,010

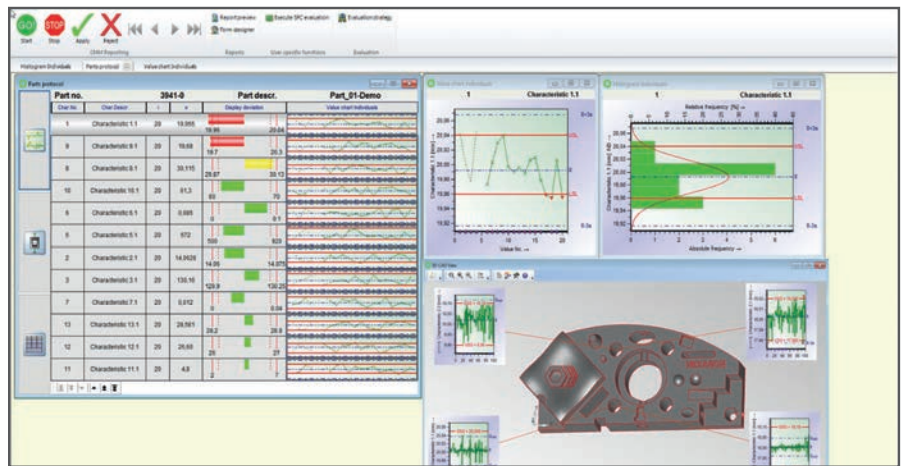
SUPPORTING DATA RECORDING

O-QIS and procella are suitable for manual data input but they also record data via serial interface. Approved as tools for real-time visualisation of results and SPC alarm control, they are now even designed to show characteristic-specific views in the CAD model. The combination of these functionalities guides the operator perfectly through the measuring task. This increases safety and minimises the risk of faulty insertions.

When the measurement data are not recorded by Q-DAS software products but by measuring instruments, e.g. a CMM, the CAD model serves as a programming basis during the creation of the measuring program.

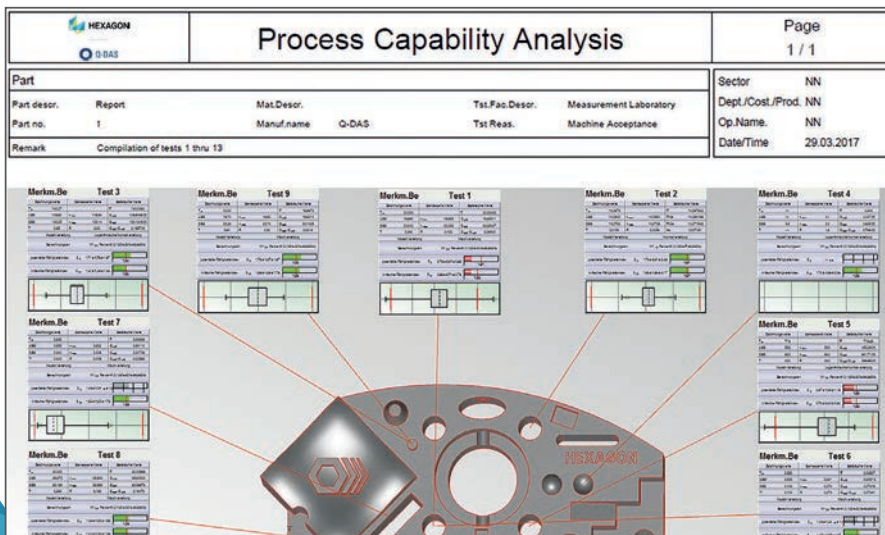
Many measuring instruments already transfer data in the Q-DAS AQDEF data format to Q-DAS products for visualisation and statistical evaluation. Due to an integrated CAD model, Q-DAS software products visualise the measuring instrument's measurement results in real time.

The application requires measurement results and an available CAD model but also a description file allocating the features/characteristics in the CAD model. Most types of measurement software support these files. Without any description file available for the allocation of features/characteristics, users once have to allocate these features/characteristics in Q-DAS products.

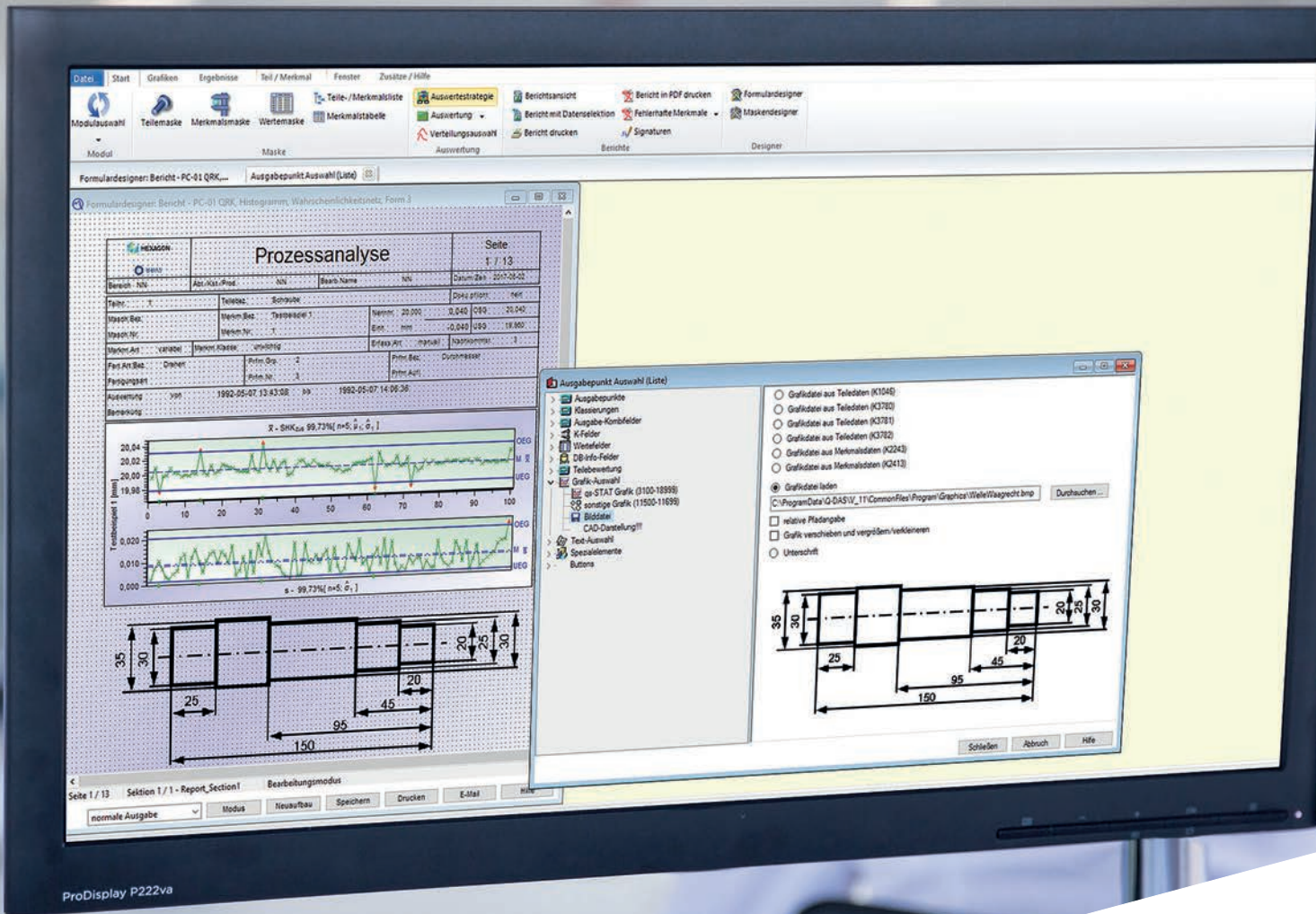


REPORTS INCLUDING 3D CAD

CAD models serve their purpose in many fields of statistical analysis; they can even be used in reports. Individual and customised reports refer to the respective CAD model. Since the features/characteristics are allocated to the drawing, the report automatically shows the relevant characteristics together with associated evaluation results.



The 3D CAD Viewer provides users with a rich set of features they may use in all Q-DAS software products. Users apply it for test planning or data recording purposes, but it also facilitates evaluations.



FORM DESIGNER REPORT AND MASK DESIGNER



All Q-DAS products provide users with report templates. These are best practices recommended by Q-DAS. Reports contain test plan information, additional texts, calculated statistics and graphics. After loading a data set, the software shows the respective contents in the selected report template.

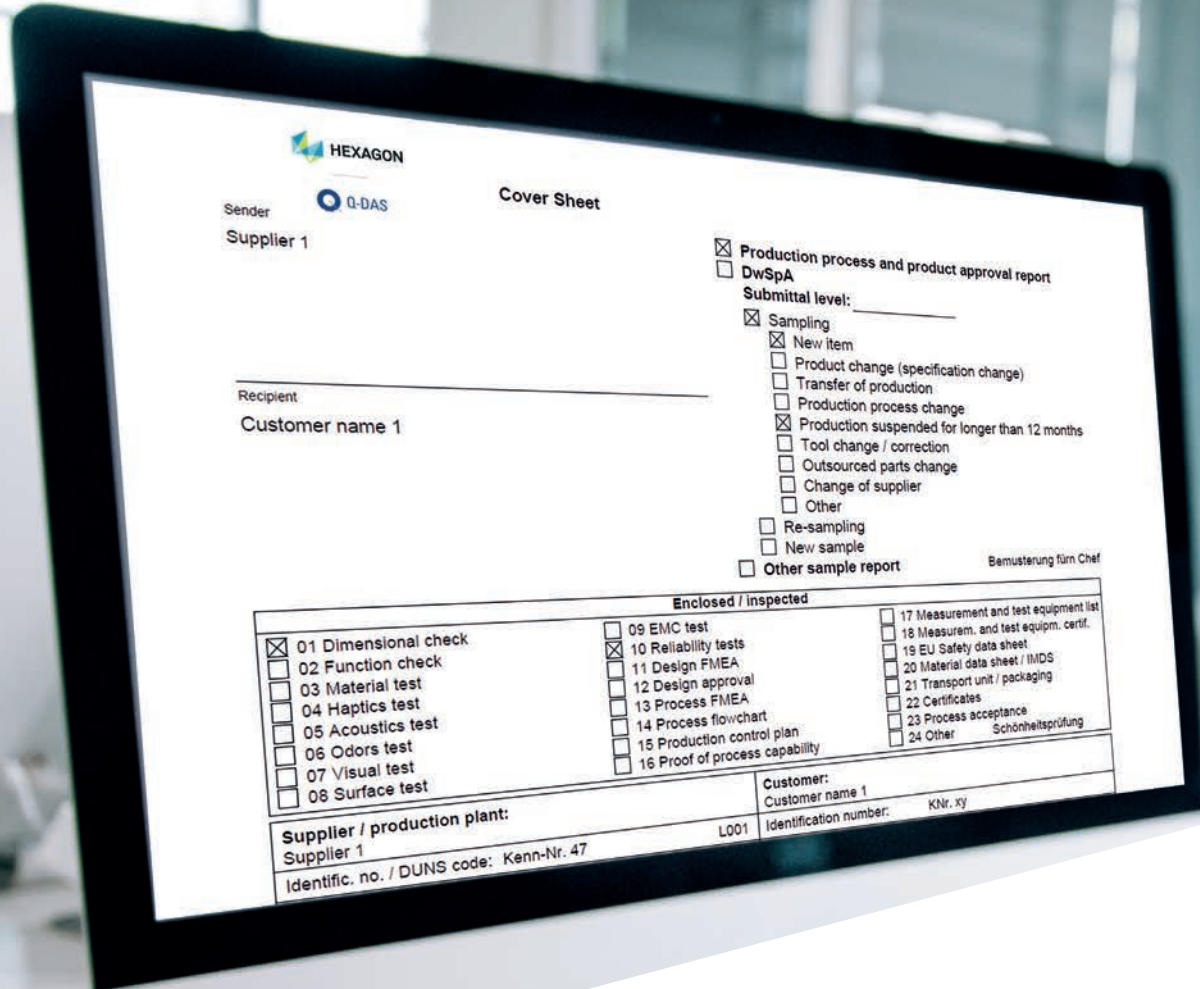
REPORT CONFIGURATION

Users needing to adapt report templates use the Form Designer to modify them or to create individual templates.

The Form Designer creates report templates for all Q-DAS products. Reports may show any kind of output point available in Q-DAS software products, e.g. texts, statistics, formulas and graphics. They also integrate jpg and BMP graphics or CAD models directly and link them to characteristics information. The recipient of a report easily understands how statistics and graphics relate to the respective product. Users position output points in a report template by using drag & drop functionalities.

HEXAGON Q-DAS				Process Capability Analysis		Page 1 / 13	
Plant/Sec: Berlin 2	Dept./Cost.Prod:	Art. 2	Op./Name:	Mastermann	Date/Time:	2017-04-28	
Part No.:	1	Part descr.:	Assembly #1	Cost Item:	no		
Mach. Descr.:	Machining & Assembly C	Char. Descr.:	Test 1	Nom. Val.:	20.000	0.040	USL: 20.040
Mach. No.:		Char. No.:	1	Unit:	mm	-0.040	LSL: 19.960
Char. Type:	variable	Char. Class:	unimportant	Rec. Type:	manual	Decimal Pl.:	3
Prod. Type/Descr.:	Turn	Gage Grp.:		Gage Descr.:	Diameter		
Production Type:		Gage No.:		Gage Res.:			

The Form Designer is often applied together with M-QIS Engine in order to create individual reports for different recipients. Users select and apply the created report templates in Q-DAS products.



INITIAL SAMPLE REPORT

INSPECTING INITIAL SAMPLES

Initial Sample Report is designed for the documentation of initial sample inspection results prior to the start of series production, in line with various requirements. This module handles the generation and management of requirements and initial sample reports. It supports the forms of the VDA 2 brochure and the QS-9000 requirements in several languages. The version management feature makes it possible to allocate multiple reports to a single test series or pre-production run.

Q-DAS Initial Sample Report is fully integrated into the Q-DAS software environment and may use the same database, i.e. it applies the Q-DAS ASCII transfer format. Since this data format is widely established, initial sample inspection data can easily be transferred, ensuring a continuous process chain linking all Q-DAS products from initial sampling, machine capability and preliminary process capability to ongoing process capability and long-term studies of process behaviour.

ADVANTAGES OF Q-DAS ISR

The software provides users with integrated reports to create an initial sample report. Depending on the selected report, the input screen masks requesting the required fields open automatically.

The screenshot displays a complex form titled 'Cover Sheet' for a 'Production process and product approval report'. The form is divided into several sections:

- Production process and product approval report:** Includes checkboxes for 'Dwell/A', 'Submittal level', 'Sampling' (with sub-options like 'New item', 'Product change', etc.), 'Re-sampling', and 'New sample report'.
- Inspected / inspected:** A grid of checkboxes for various inspection types such as 'Dimensional check', 'Material test', 'Colors test', 'EMC test', 'Reliability tests', 'Design FMEA', 'Process FMEA', 'Production control plan', 'Proof of process capability', 'Measurement and test equipment list', 'BU Safety data sheet / IMDS', 'Material data sheet / IMDS', 'Transport unit / packaging', 'Certificates', 'Process acceptance', and 'Other'.
- Supplier / production plant:** Fields for 'Supplier 1', 'Kann-Nr.', 'Index', 'Version 1.0', 'Report no.', 'Name des zu prüfenden Teils', 'Znr.', 'DIN', 'Status / date', 'LINR', 'Goods inward no. / date', 'Call order no. / date', 'Offloading point', 'Customer: name 1', 'Customer number', 'P/Nr.', 'Index', 'Abgenommenes Teil', 'Znr.', 'Din', 'Date'.
- Quantity supplied:** 'Stück', 'Charge 1', '28.0 kg'.
- Supplier confirmation:** A section for the supplier to confirm sampling and IMDS data record creation, with fields for 'Name', 'Department', 'Telephone', 'Fax', 'E-mail', 'Date', and 'Signature'.
- Customer decision:** A section for the customer to approve or reject the report, with a grid for 'Individual approvals' and a 'Comments' field.
- Approved with conditions, re-sampling required:** A section for conditional approval, with a 'Deadline for re-sampling' field.
- Rejected, re-sampling required:** A section for rejection, with a 'Deviation approval no.', 'abgewichen', 'Feld', 'units', '2002-08-20', 'No. of units', '2002-08-20', and 'Comments'.

To avoid the need for entering recurring reference data again and again, such reference data can be managed through reference catalogues. The reference data entries can be selected directly and will be transferred to the input screens. A combo box provides the catalogue entries in the associated windows. Several catalogues are available: customers, creators, reasons for sample inspection, types of sample inspection, gauges, units etc.

SUMMARY OF FUNCTIONS

- Output of individual values and min/max values with comments on each characteristic on the output form
- Option to specify whether the individual values for each characteristic should be output
- Out-of-tolerance values highlighted on the output form
- Symbols for types of measured characteristics (shape and positional tolerances, physical parameters, ...) are included. The report shows the corresponding symbols.
- Selection based on the different criteria of report elements
- Classification of characteristics according to the method of sample inspection; i.e. verification of appearance, dimensions, materials, reliability or function
- Characteristics are provided automatically on a separate page for each type of sample inspection
- Entering circulation lists
- Configuration of input screens
- Data analysis with export to qs-STAT
- Form Designer to design company-specific reports
- Management of constituents/hazardous materials in purchased parts



TRAINING AND CONSULTING

EFFICIENT APPLICATION OF Q-DAS SOFTWARE

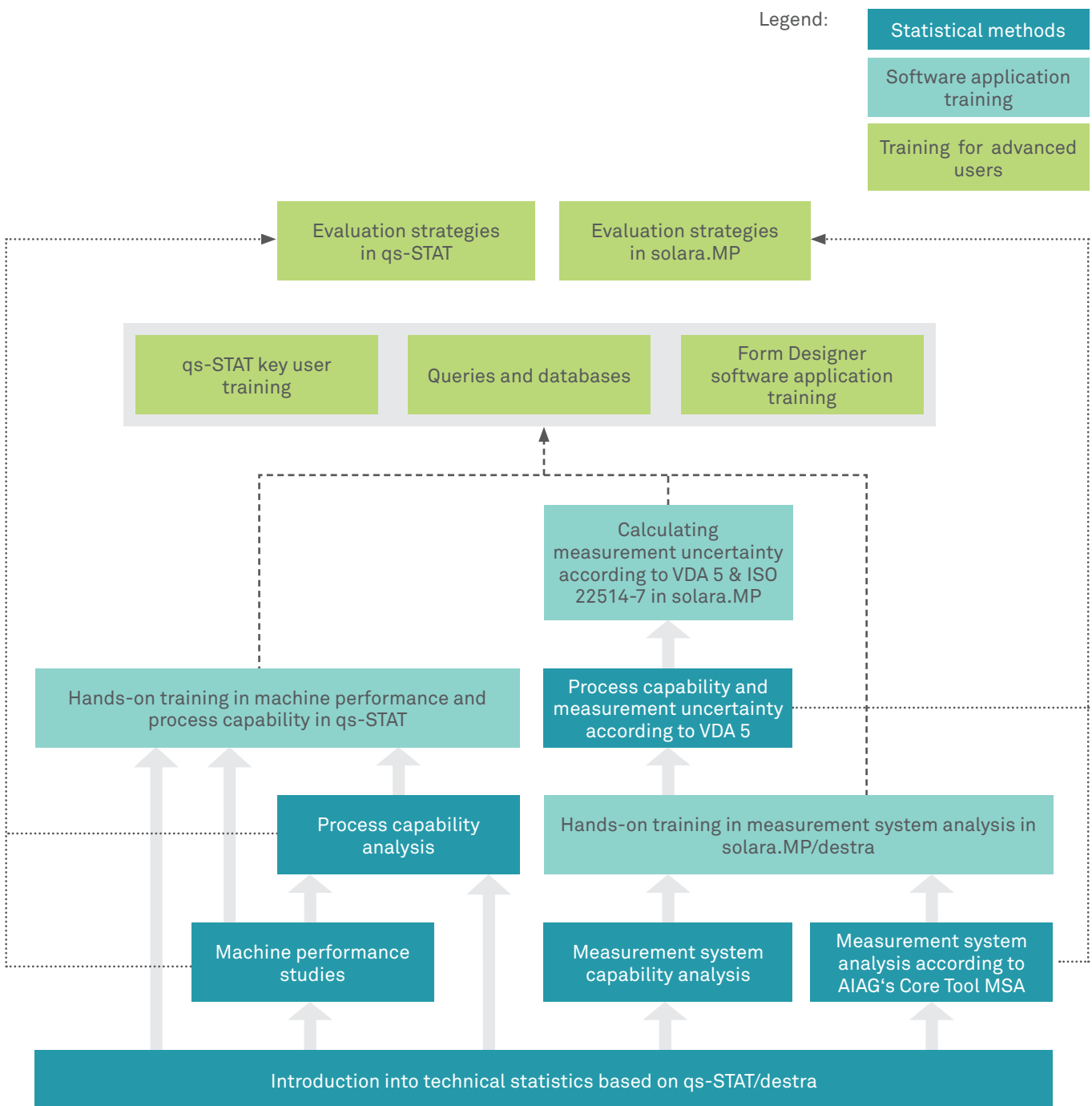


Numerous open training courses, in-house seminars and consulting services help users apply Q-DAS software efficiently. Q-DAS trainings cater to the different quality assurance tasks in a company and may be adapted to individual requirements.

TASK-RELATED SOFTWARE APPLICATION TRAINING

Q-DAS provides specific software application training for different target groups based on Q-DAS software products. These training courses include classical hands-on seminars and the education of product experts, but also training for software administrators enabling them to maintain and manage Q-DAS software.

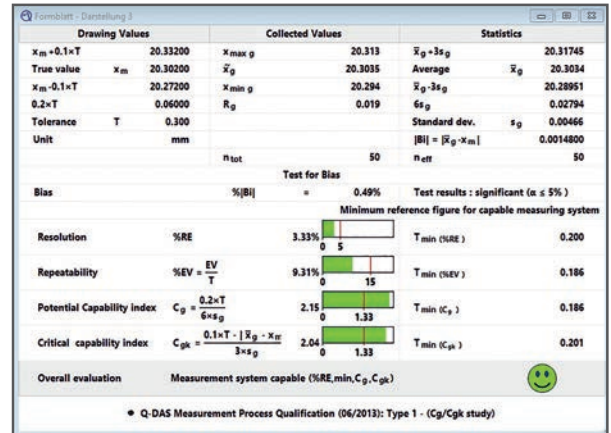
Q-DAS never stops enhancing their software products to best support users in their individual tasks. The software application training we offer perfectly suits specific tasks or user groups.



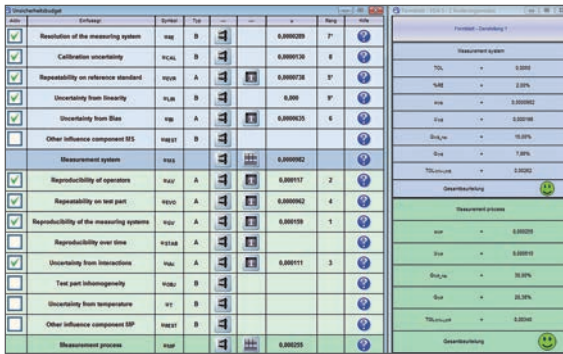
MEASUREMENT SYSTEM ANALYSIS IN solara.MP/destra

Basic requirement for proper machine acceptance or an appropriate process analysis is the established capability of the applied measuring equipment.

This seminar shows users how to apply different methods of measurement system analysis in solara.MP and destra. They visualise evaluation results in consideration of various company guidelines and pick up some useful tips and tricks on handling files and databases.



MEASUREMENT UNCERTAINTY ACCORDING TO VDA 5/ISO 22514-7 IN solara.MP



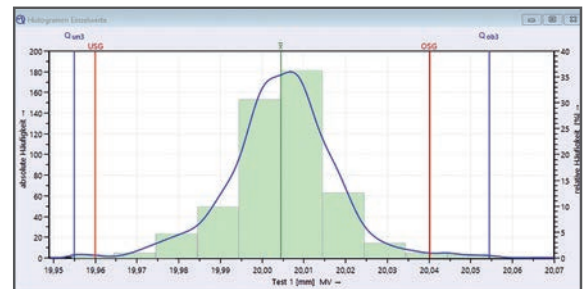
Most of the methods of measurement process capability provided by VDA Volume 5 and ISO 22514-7 can only be applied with the help of computers.

Learn how to use the methods for determining measurement system and measurement process capability in solara.MP. The seminar also shows users how to visualise evaluation results and how to consider different company guidelines.

MACHINE PERFORMANCE / PROCESS CAPABILITY IN qs-STAT

It is crucial to master statistical methods and suitable software to perform machine performance studies and process capability analyses efficiently.

This seminar teaches how to conduct machine performance studies and process capability analyses in qs-STAT. Users gain necessary background knowledge of efficient data storage and are able to comprehend evaluation strategies and associated evaluation results.



ADDITIONAL Q-DAS SOFTWARE TRAINING COURSES AND SERVICES

Q-DAS offers special consulting services as well as individual and advanced training courses focusing on software-specific aspects or on specified tasks, such as

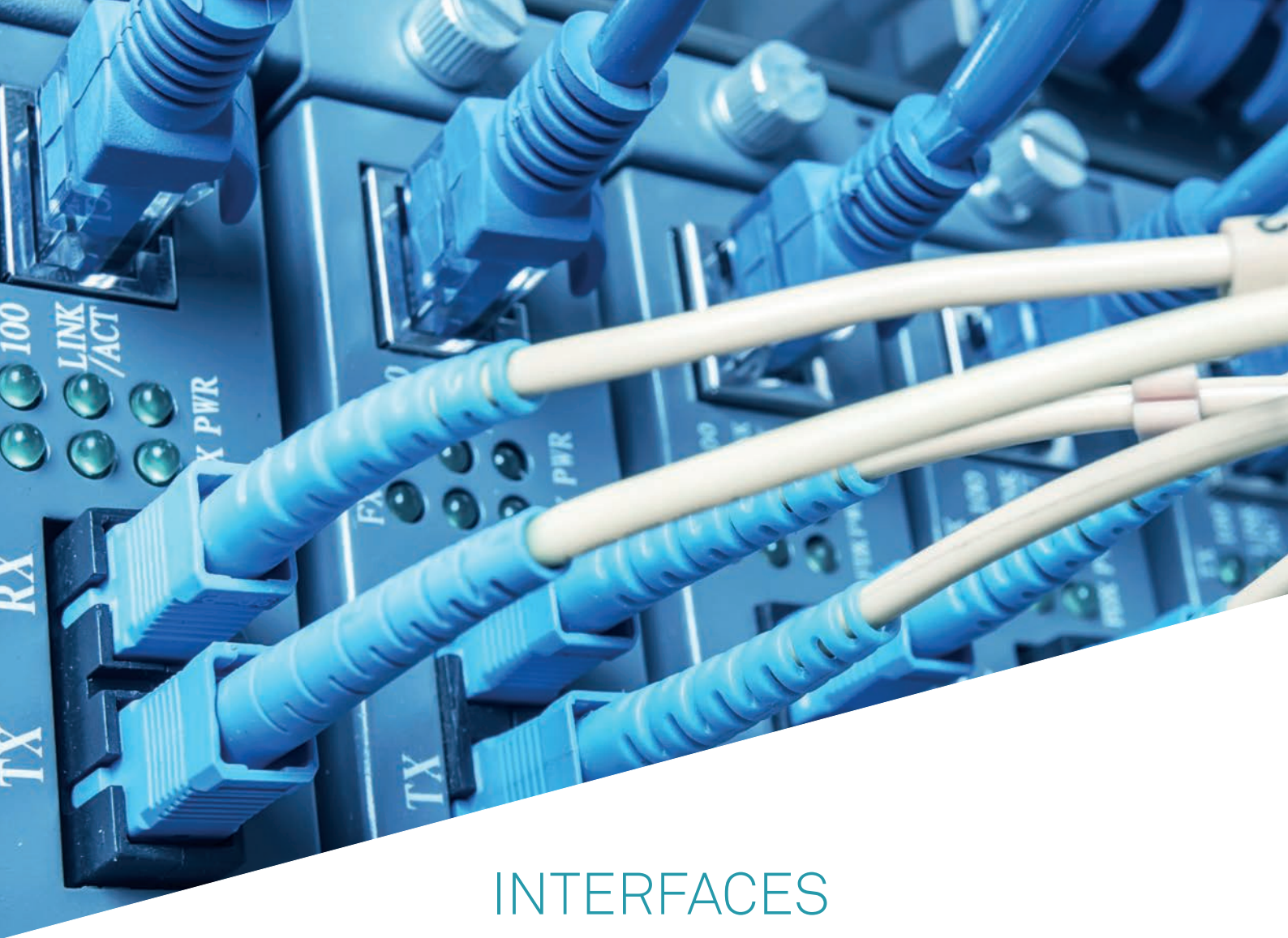
- Seminars for users and administrators configuring the software in a company (key users)
- Training courses on the creation of reports and input screen masks in the Form/Mask Designer
- Efficient application of databases and selections
- Upgrading from version 11 to version 12
- Development of company-specific evaluation strategies
- How to handle and adapt evaluation strategies correctly

PROFESSIONAL, INDIVIDUAL AND EFFICIENT CONSULTING SERVICES

You benefit from a broad variety of consulting services due to an extensive network of experts in different fields and industries. Here is a selection of topics we cover. Q-DAS supports you in...

- **introducing SPC**, the implementation of Q-DAS statistical software included.
- creating **GPS-compliant technical drawings and in tolerancing aspects.**
- performing **measurement system analyses** and in **tolerancing aspects.**
- designing, introducing, maintaining and developing **management systems** and teach you how to apply them efficiently (ISO 9001, IATF 16949, EN 9100, ISO/IEC 17025, ISO 14001, ISO 50001).
- performing potential analyses to **optimise processes.**
- **implementing process improvement strategies**, especially **Six Sigma.**
- creating **company-specific and industry-specific audit concepts and audit programmes.**
- **conducting internal and supplier audits** in compliance with industry standards.
- undertaking the tasks of an external **management representatives for quality and/or environment** in SMEs

International offices, distribution partners and subsidiaries of Q-DAS make these services available worldwide.



INTERFACES

There are different ways of transferring measurement data to Q-DAS software. Most frequently, data are transferred from portable measuring instruments or multiplexers via serial interface or via data interface in the Q-DAS AQDEF data format. Data available in a different format are transferred to the Q-DAS software by means of a converter. Due to interfaces to ERP, CAQ and MES, Q-DAS software can be implemented in an existing IT landscape.

AQDEF®: ADVANCED QUALITY DATA EXCHANGE FORMAT

The AQDEF (Advanced Quality Data Exchange Format) data format is specified for the standardised exchange of data between measuring equipment and Q-DAS software products. The AQDEF industrial work group defines the contents of this data format and always considers basic customer requirements. Its members thus guarantee that the data format offers a representative scope and a uniform interpretation and application of key fields.

The result the work group provides is a standardised catalogue of data fields that are relevant to many users. This catalogue lays the foundation for a quick and clear evaluation based on the acquired data in order to reach smart and reliable decisions without any time-consuming and error-prone data conversion.



Q-IF INTERFACES CONNECTING PORTABLE MEASURING EQUIPMENT AND MULTIPLEXERS

Users transfer measurement data directly to Q-DAS software products via serial interface (RS-232 or USB). Q-DAS products currently support more than 150 measuring instruments and multiplexers by default. There are various interface packages available connecting these devices to the software.

Q-DAS packages offer interfaces for the communication between different types of portable measuring equipment, measuring instruments having a RS-232 interface, various measurands and multi-channel multiplexers connecting several measuring devices and the software. Using boxes connected to external signals or automated facilities, you may control the transfer of data through PLC. Interface packages for data loggers/data collectors support the integration of mobile data recording devices.



Q-SAP INTERFACES TO SAP R/3 QM VIA STI AND IDI

The interaction of Q-DAS software products with SAP QM offers a comprehensive solution for the joint application of both systems. While SAP serves the optimisation of central business processes, Q-DAS products provide users automatically with a complete overview of measurement and test processes and evaluate these processes based on statistical methods.

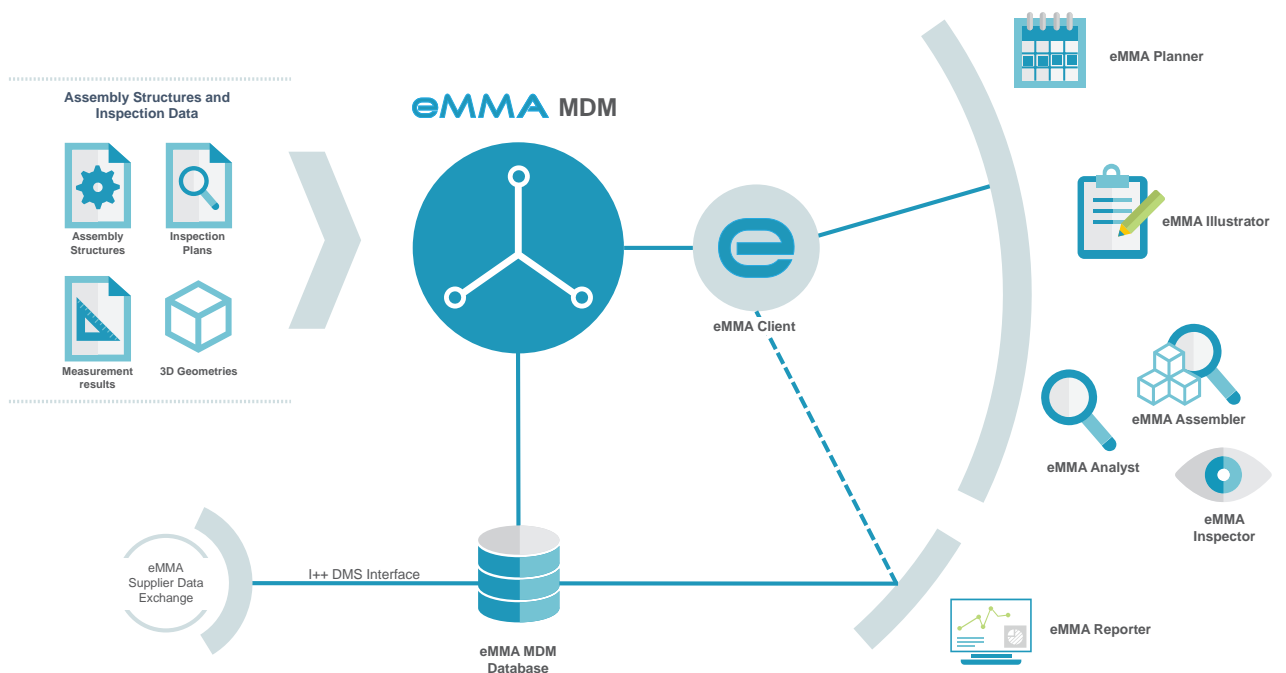
The QM module of SAP R/3 offers two interfaces to external systems – the “statistical data interface” (QM-STI) and the “inspection data interface” (QM-IDI). This is how users transfer relevant data such as inspection lots, characteristics and measured values. Depending on the respective application, users store measurement and test data permanently in SAP QM or Q-DAS products transfer the compressed results back to SAP QM. Both methods ensure the consistency of the SAP system. For statistical evaluations, data are either stored in the Q-DAS database or SAP QM transfers them to Q-DAS products via QM-STI.



eMMA SOFTWARE SUITE

3D MEASUREMENT DATA MANAGEMENT

eMMA Software Suite offers an integrated data management system for the entire process of 3D metrology from the planning of 3D features and their tolerances along the assembly sequence to quality control in production processes.



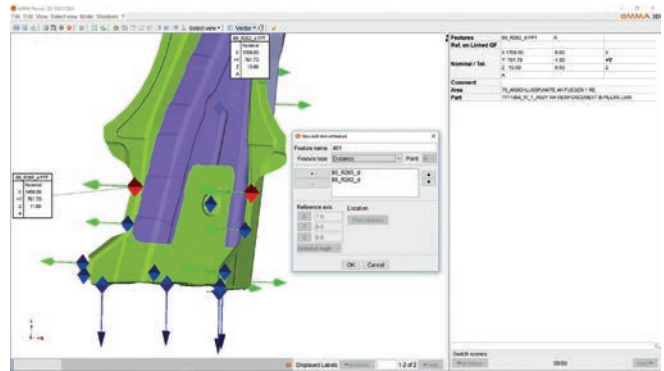
eMMA MDM SERVER/CLIENT

eMMA MDM is an enterprise IT solution created to structure and manage 3D measurement data, thus closing the information gap in the quality assurance process. eMMA MDM provides controlled access to measurement plans, alignment systems, tolerances, measurement results, and analysis sessions.

An integrated and central data management gives full control of all data. The import and export of quality data into/from different data formats (*.dmi, *.dmo, *.dfq, *.csv, etc.) is thus possible. eMMA MDM Server/Client tracks and manages project changes and user interactions with the help of versioning and change management.

eMMA PLANNER

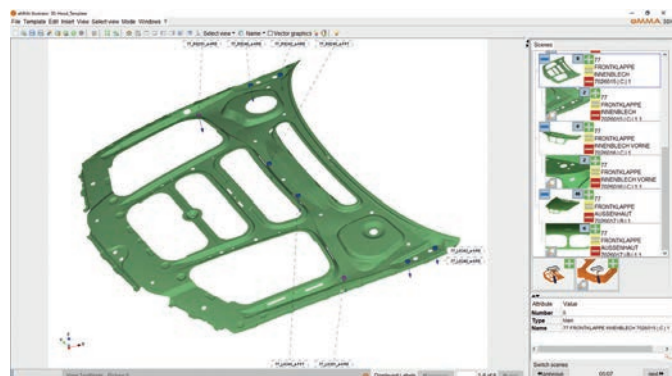
eMMA Planner is a module created to facilitate the management of inspection plans for both single parts and assembly structures. eMMA Planner supports multiple operations such as creation of inspection plans for assembly structures, modification of feature tolerances and feature attributes, creation of linked features among others.



The rich 3D native environment that accompanies all eMMA modules allows the intuitive exploration of all elements of an inspection plan. The 3D environment embedded into eMMA Planner enables the edition of existing features as well as the definition of linked-features while preserving a spatial reference to the geometry associated with the corresponding inspection plan. This simplifies the selection of features belonging to a particular region in the geometry or the identification of spatial relations between features.

eMMA ILLUSTRATOR

Generating quality reports for thousands of parts can become a time consuming and cumbersome task. eMMA Illustrator is the perfect module for designing report templates. Its 3D interactive environment allows users to easily create scenes in which customised geometry views, feature sets, and information related to an inspection plan will be displayed. In addition, the automatic generation of scenes can be used to considerably speed up the creation of report templates.

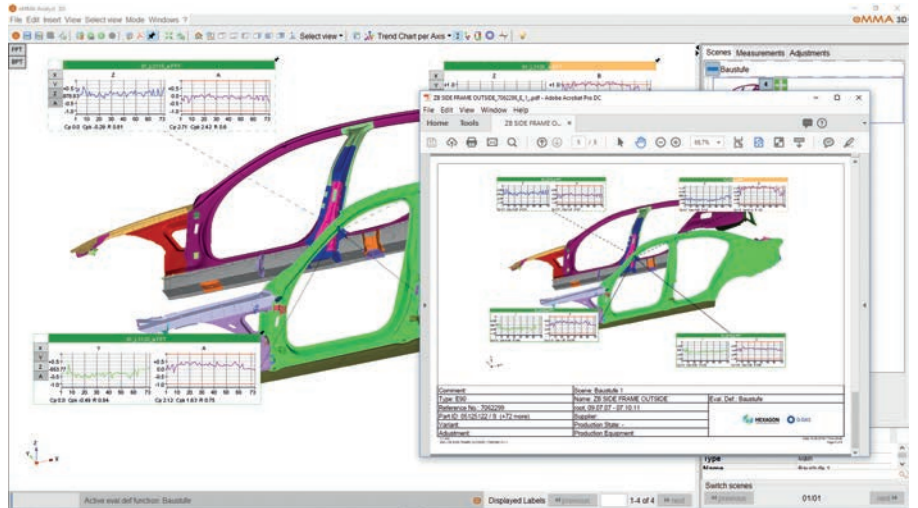


eMMA ANALYST

eMMA Analyst is a flexible and versatile module for the analysis of measurement results. Using statistical key performance indicators (KPIs), it provides insights that enable users to have better control over prototyping, launch, ramp-up and production processes. eMMA Analyst supports both PDF documentation and interactive on-the-fly 3D analysis.

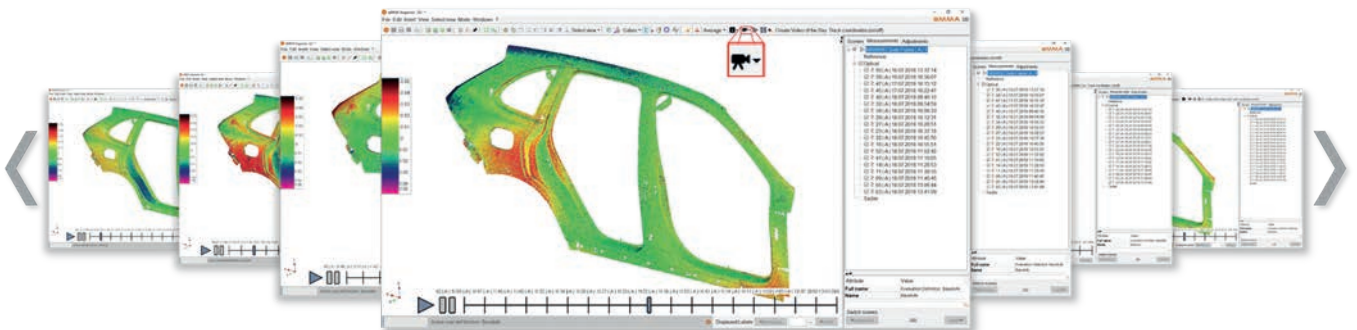
The 3D environment integrated into eMMA Analyst offers different graphs to display the measurement results associated with each feature. Besides the natively supported graphs, eMMA Analyst also supports the computation and visualisation of statistical metrics using the qs-STAT engine.

The fast and easy loading and selection of measurement results along with the graphic options for the display of the results provide a clear overview of the production quality over time. The results of these analyses can later be saved as a 3D session or exported as a PDF report or PowerPoint presentation for easier distribution.



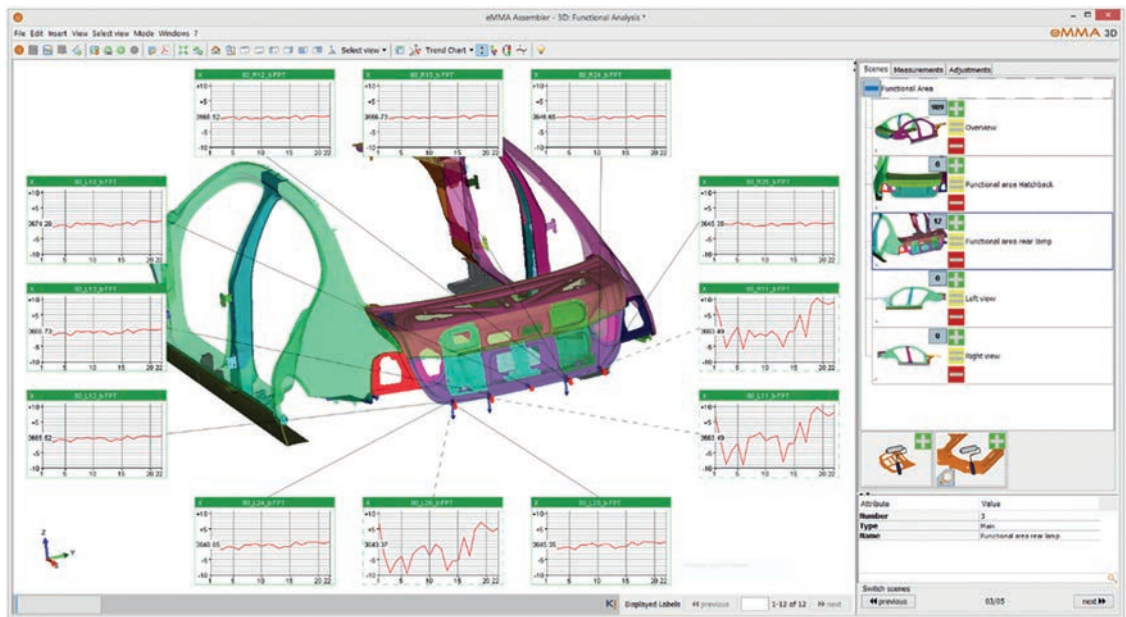
eMMA INSPECTOR

eMMA Inspector is a module specially designed to support the easy and fast analysis of large sets of optical measurement results. The rich 3D native environment enables users to smoothly explore and interact with the data as they identify and compare regions of interest. Likewise other eMMA modules, eMMA Inspector also supports both PDF documentation and interactive on-the-fly 3D analysis while also providing the option to create a video of the day.



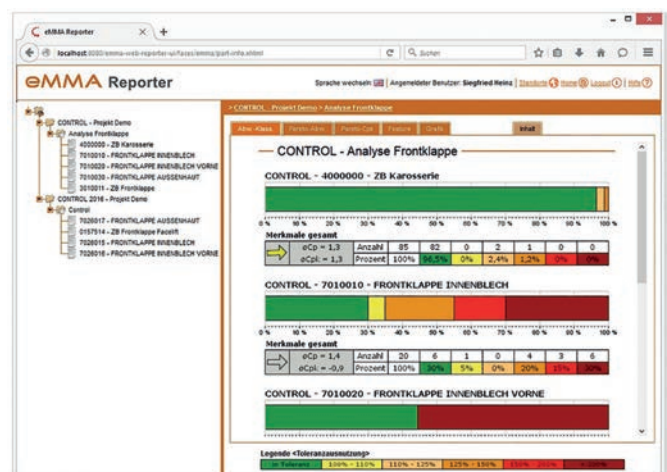
eMMA ASSEMBLER

eMMA Assembler is a module for graphical analysis of virtual assemblies based on eMMA Analyst. It combines the powerful analytic capabilities of the eMMA Analyst to be applied simultaneously to multiple component parts and virtual linked-features. Individual parts or assembly structures of the functional areas can be assembled and analysed with transformations according to the assembly position, evaluation definitions, manually generated or adopted local alignment systems to form a virtual assembly. For simultaneous analysis of the measurement results of all selected components, it is possible to add individual features as well as new linked-features from the component parts involved. For instance, one of the most popular applications of eMMA Assembler is virtual analysis of flush and gap combining multiple parts. For documentation, scenes with any component and feature selection can be exported as a presentation and PDF report.



eMMA REPORTER

Quality assurance at the production line requires the detection of tolerance deviations in real time and the identification of the cause of such deviations. eMMA Reporter is a web-based module that allows company-wide monitoring of manufacturing quality at any number of production sites in real time. Tolerances defined within the product design data are used as the basis for the evaluation of different production and construction stages. The software recognises and reports deviations from manufacturing tolerances in real time and supports root cause analysis. In the case of a detected out-of-tolerance deviation, the system sends customisable warning messages via email or SMS to authorised users.





Q-DAS® SERVICES

Our broad range of services supports customers in applying Q-DAS software in an optimal way.

PROJECT MONITORING



As a qualified and experienced team, the Q-DAS system integration centre supports the introduction of Q-DAS software products and the implementation of the Q-DAS CAMERA Concept. We assist you in all phases of the project, from design and specification to the maintenance of the running system.

WORKSHOPS



We discuss the respective details with respect to installation, configuration and initial operation of Q-DAS software in the course of a workshop. The first step is to define and analyse the current situation in your company. The understanding of process structures and operations offers important information to build a system fulfilling your individual requirements.



INSTALLATION AND CONFIGURATION

The implementation of the Q-DAS CAMERA Concept starts with the installation. We install the respective software components according to your system specifications and configure and adjust them to your field of application.



UPGRADES

Do you want to upgrade your software version to benefit from an advanced or extended range of functions? Together we define an individual upgrade strategy, determine requirements and discuss the system configuration.



PRODUCT TRAINING COURSES

We recommend you conduct an individual training programme meeting the demands of your company already during or after the installation. Depending on the topics concerned, these practical seminars are provided by experienced TEQ trainers of Q-DAS GmbH. Please find our comprehensive training programme on our homepage.



SYSTEM MAINTENANCE AND OPTIMISATION

We support you in maintaining the installed system even after a successful implementation. Regular maintenance ensures long-term system stability. Maintenance includes the optimisation of data management and the definition of archiving strategies to improve system performance even when you process a huge amount of data.



WEB SUPPORT

We perform remote maintenance and provide the option of desktop sharing for a quick and easy support regardless of location. Depending on the question you have, we access your system via Internet to save costs and time.



SYSTEM DOCUMENTATION

Comprehensive system installations require an individual technical program documentation helping users operate and maintain the system.

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You are also welcome to contact any divisions or branches of Hexagon Manufacturing Intelligence.

Please find contact details at HexagonMI.com.



WE ARE PLEASED TO SUPPORT YOU.
PROFESSIONALLY.



Hexagon Manufacturing Intelligence helps industrial manufacturers develop the disruptive technologies of today and the life-changing products of tomorrow. As a leading metrology and manufacturing solution specialist, our expertise in sensing, thinking and acting – the collection, analysis and active use of measurement data – gives our customers the confidence to increase production speed and accelerate productivity while enhancing product quality.

Through a network of local service centres, production facilities and commercial operations across five continents, we are shaping smart change in manufacturing to build a world where quality drives productivity. For more information, visit HexagonMI.com.

Hexagon Manufacturing Intelligence is part of Hexagon (Nasdaq Stockholm: HEXA B; hexagon.com), a leading global provider of information technologies that drive quality and productivity across geospatial and industrial enterprise applications.

-  COORDINATE MEASURING MACHINES
-  3D LASER SCANNING
-  SENSORS
-  PORTABLE MEASURING ARMS
-  SERVICES
-  LASER TRACKERS & STATIONS
-  MULTISENSOR & OPTICAL SYSTEMS
-  WHITE LIGHT SCANNERS
-  METROLOGY SOFTWARE SOLUTIONS
-  CAD / CAM
-  STATISTICAL PROCESS CONTROL
-  AUTOMATED APPLICATIONS
-  MICROMETERS, CALIPERS AND GAUGES
-  DESIGN AND COSTING SOFTWARE



Q-DAS software sets standards for quality assurance in industrial production. 150 000 users all over the world trust in Q-DAS and successfully apply its software as well as associated training and consulting services to raise product and process quality.

More than 8000 customers from various industries have already chosen Q-DAS solutions, and are profitably harnessing the full potential of correct and reliable statistical evaluations as well as the planning of 3D features along the assembly sequence. Q-DAS software products plan measurement processes and record, visualise and evaluate data in 55 countries to increase efficiency.

The broad Q-DAS catalogue of hands-on seminars delivers essential methodological skills of statistical process control, production metrology and quality assurance. This is complemented by general and company-specific training in any available Q-DAS software product. These support our users in focusing on goals while fulfilling their tasks.

q-das.com