dhs

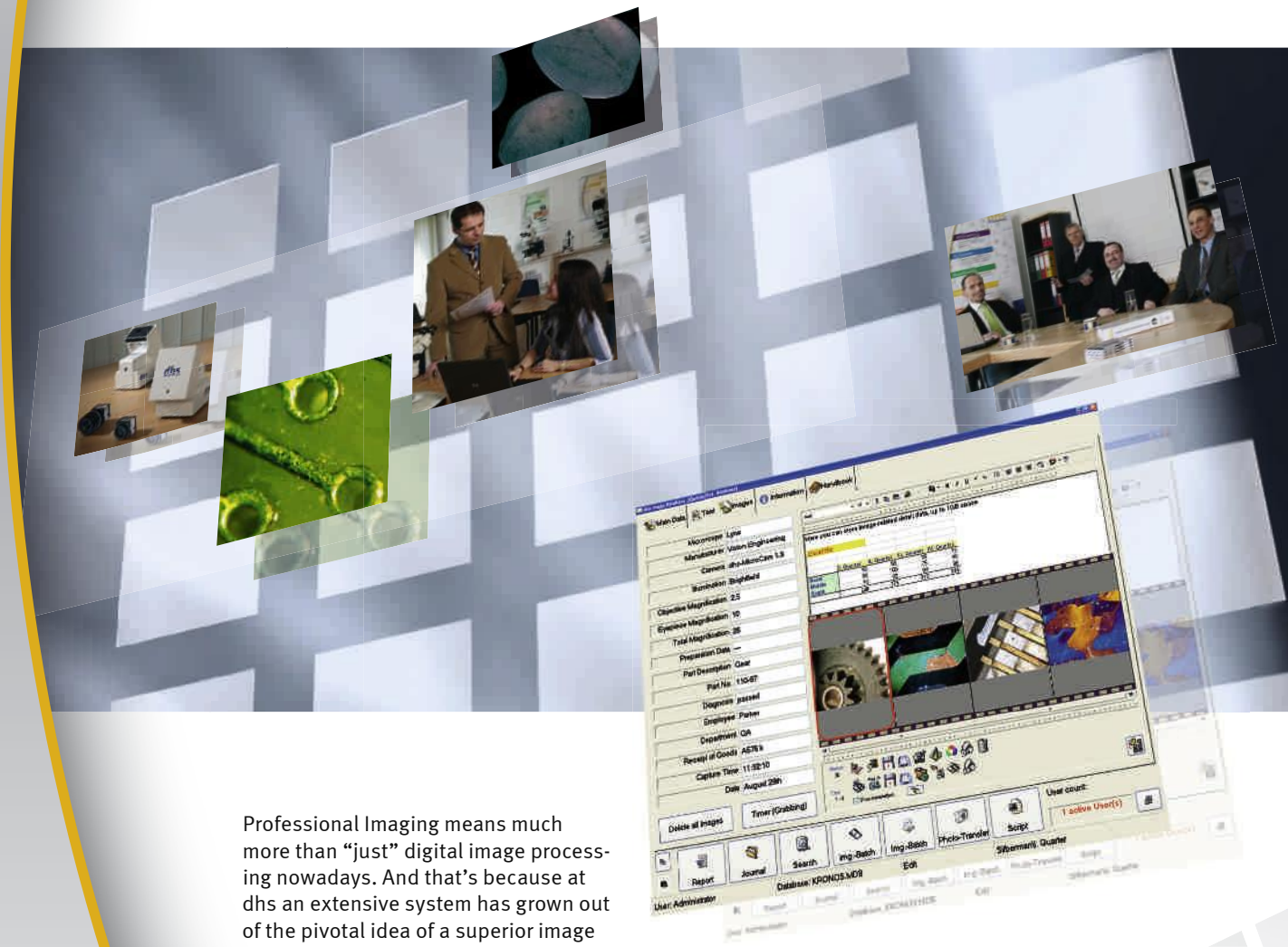
Image Data Base

Professional

Imaging by dhs

Professional Imaging by dhs

The entire world of digital imaging in one system.



Professional Imaging means much more than “just” digital image processing nowadays. And that’s because at dhs an extensive system has grown out of the pivotal idea of a superior image database.
A cost-saving full-service package emerged around the processing of images – one that is individual, flexible and easy to handle. It also includes all the relevant segments: software, hardware, installation, service, support and training.

Everything from one source and all functions tailored to meet the specific requirements of each individual customer.

It’s an attractive range of services that you too can use. Once you’ve opened it you’ll be surprised at how much time and effort you can save.

Professional Imaging by dhs– a global success.

The language of images is international – as is the remit of your optimal digital processing. The solution: Professional Imaging by dhs.

The system knows no country frontiers nor does it make any restrictions with regard to industrial segments or the size of companies.
Our system reaps extensive praise and recognition from users in many countries who are impressed by its high efficiency.
The dhs Image Data Base wins over users due to its flexibility, transparency and ease of learning – virtues that are appreciated all over the world!

The dhs software and what it does.

The dhs Image Data Base has been developed by practitioners for practical use. In close cooperation with thousands of users in the most varied industrial segments.
That's what makes it both universal and individual at the same time. The secret is that it combines all the techniques of the highest level of digital imaging with solutions tailored to meet every user's requirements.

The entire work process is covered by one software package:

Archiving

Acquisition

Processing

Analysis

Documentation

A freely programmable software solution with interfaces to all desired applications. The best thing about it: its operation is uncomplicated and can be learned in no time at all.

The complete dhs menu.
As good as each individual ingredient.

You'll like this. We offer you an elaborate menu as one complete offer. Everything to do with the dhs Image Data Base from one source, professionally served.

The appropriate hardware, for instance PC systems, frame grabbers or cameras, microscopes, adapters, light sources, accessories ... all products made by renowned manufacturers. System installations, trainings in our customer centres all over Germany or onsite at your location, organisational counselling ... in short everything to ensure, whether directly or indirectly, that the workflow of your professional image processing is smooth. Cheers!

The dhs module system.
To add on, adapt and extend.

The dhs Image Data Base has character. Module character. Its flexible configuration options and easy adaptation to existing structures guarantee that the image database's field of application is almost unlimited.

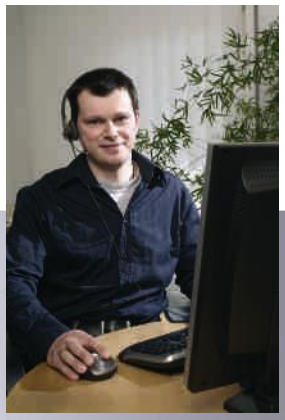
It's no wonder that the dhs Image Data Base is the ideal solution in all industrial segments in which archiving and processing of digital images by CCD cameras and other image sources are of paramount importance, i.e. in materialography, biology, medicine, electronics/semiconductor technology, the aerospace industry, communication technology, the food industry, chemical engineering, pharmaceuticals, textile industry and criminalistics, to name but a few examples.

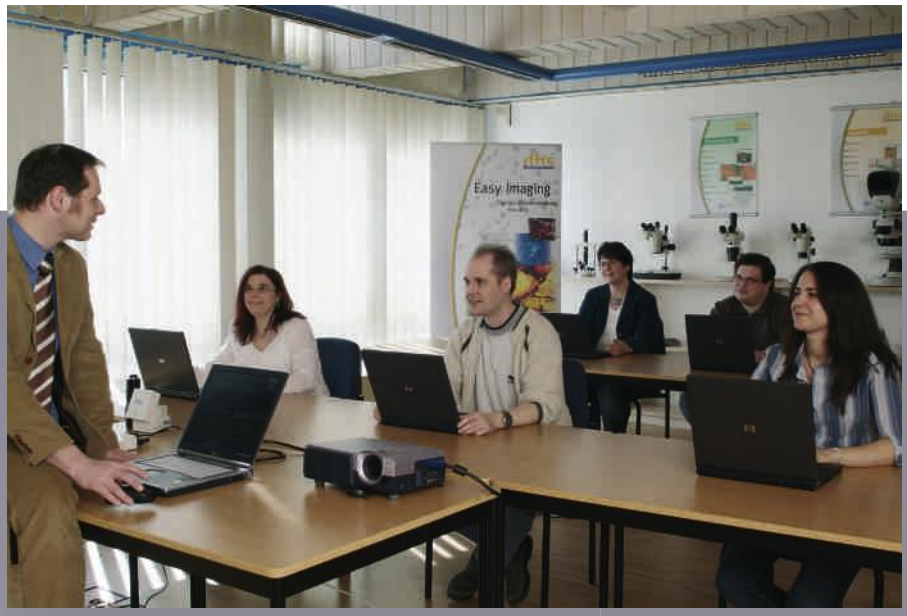
“Panta rhei”
Always up-to-date with the dhs Service Package.

“Panta rhei”, many years ago the Greek Philosopher Herakleitos had already formulated what now holds true more than ever in the digital era. “Everything flows”, renews itself and is in continuous progressive motion.

The dhs Service Package allows you to benefit via CD-ROM and online updates (via Internet) from the permanent functional extensions and program optimisations in your dhs Image Data Base. Our competent specialists advise you via the dhs support hotline (free phone).

This is supplemented by remote maintenance with the easy-to-use desktop sharing software of our cooperation partner “pcvisit”. Of course, the dhs Service Package also includes a user training day on our company’s premises. **In the case of new software acquisitions the Service Package is free for the first year.**





www.dhssolution.com
The latest information – 24 hours a day.

The dhs website on the Internet is the ideal source for obtaining more information on the dhs Image Data Base, the company and its services.

Of special interest and also included in the dhs service package is your individual password protected support area on the dhs homepage, which offers first-hand news and the retrieval of “Tips & Tricks” (FAQ).

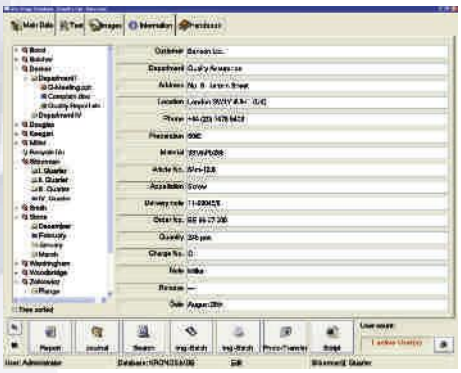
Archiving

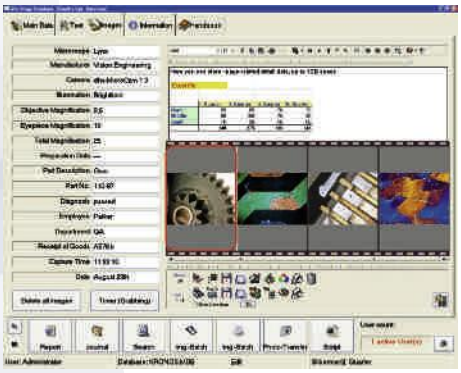
Since the early nineties the dhs Image Data Base has been globally employed as a modular image processing system in the QA and laboratory segment for image archiving, acquisition, processing, analysis and documentation.

Transparent in structure, flexibly adaptable, easy to learn, it enables you to implement it successfully in your daily work in no time at all. That's how Professional Imaging works!

Basic Module

The **Basic Module** serves as a starting point and basis within the dhs Image Data Base. This comprises an SQL database with very flexible configuration options. It serves to capture and administer image and text data as well as documents. Existing corporate and organisational structures can be easily maintained in the freely configurable database structure according to the well-known explorer tree principle (incl. integration of external data, such as CAD drawings, Excel sheets, PDF files and much more). The separate capture of master data and image data allow the optimisation of your workflows. It also allows your projects to be ideally structured and described. The software can be easily individualised to meet your personal requirements, e.g. using the integrated form editor, which allows you to create your own screen masks in no time at all.



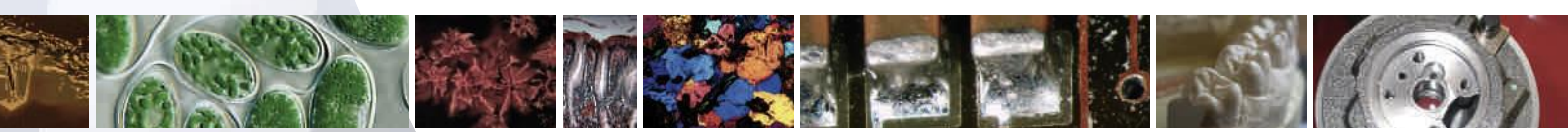


An intuitively operable user interface, standard operating routines and universal context-related online help (F1 key) support the smooth introduction of the dhs software into your company. Extensive search options, the perfect integration in the Microsoft Office™ product family, excellent import and export functions for images, texts and files form just as much part of the basic package as does a completely free programmability of the entire software – one of a kind in this scope on the market!
Thanks to the modular construction, the dhs Image Data Base can be extended and combined with all the extension options described in this brochure at any time, meaning that nothing more stands in the way of your desired configuration!

Back-ups/Remote Storage

The **Back-ups** / **Remote Storage** function gives you two functions in one module. Part 1 serves to create back-ups, thus securing all the images, documents and evaluations you've collected in the database. You get an easy-to-use tool, with which one can generate and also replay back-ups of entire image databases in very few moves.

Part 2 of this module is the image Remote Storage. In this process the high-resolution original images, which require a great deal of storage space, are relocated from the database to an offline archive (e.g. server drive, CD-ROM or DVD), in order to create more space. Small gallery images (thumbnails) and all text information remain in the dhs Image Data Base for future searches. Cross-references ensure a link between database and offline archive.



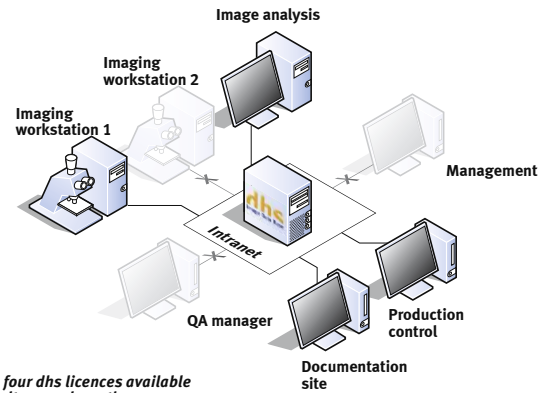
Archiving

dhs Image Data Base

In addition to single workstation applications, the dhs Image Data Base is predominantly used in networks. Technically the program has been conceived both for standalone use in small companies and for globally active groups, which use the software via Intranet or Internet. Multi-user databases, a form editor for configuring your own screen masks, an extensive user and authorisation administration, as well as the link to other software packages are available (e.g. LIMS, databases, PPS systems, equipment control and more) or can be created on customer request.

Licence Server

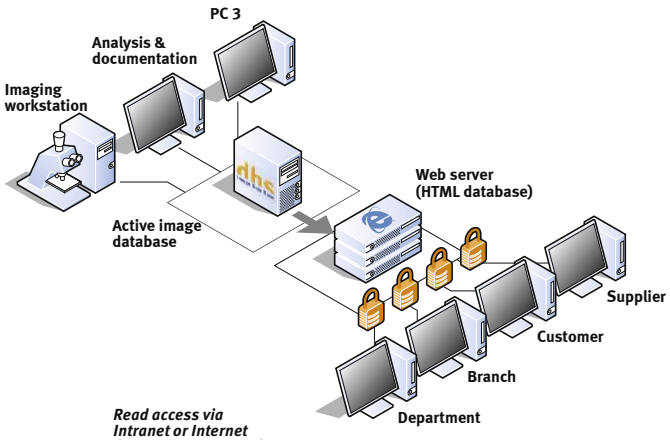
The **Licence Server** serves to administer the authorisations in the corporate network and allows you to use the acquired dhs Image Data Base licences much more flexibly. The "floating licence principle" means that only the number of simultaneously required licences (so-called concurrent licences) need be available, and these can be distributed among any number of computers in the company. That can save you considerable costs in some cases! Gone is the time when a separate licence was needed for each individual PC or employee. This method, for instance, allows 7 employees to share the 4 centrally managed company licences, if no more than 4 of these are used simultaneously (see below). As a general rule, thus guaranteeing the completely free configurability of all the individual dhs extension modules.



e.g. four dhs licences available simultaneously on the company server on the Intranet

Web Server

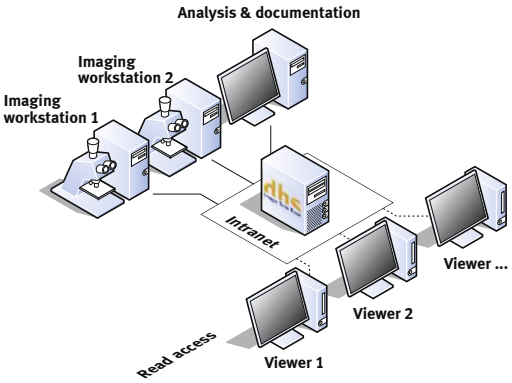
The global provision of images, data and documents without any restrictions – this is no longer just a dream with the dhs **Web Server**! This now allows all the information stored in your image database to be made available to an unlimited number of people. Whether in your own company via Intranet or on the premises of your customers, suppliers and business partners via Internet, and irrespective of whether via Windows PC, Apple Mac or Linux: MS Internet Explorer™, which is universally available, is the only access prerequisite needed. Our Web Server allows you to convert your image database(s) into a web-compliant format. Fully automatically controlled, for instance every night the database or a predefined part thereof is sent to the Web Server where it is then available. The pure read access prevents any unintended changes. Your database thus remains untouched at all times.

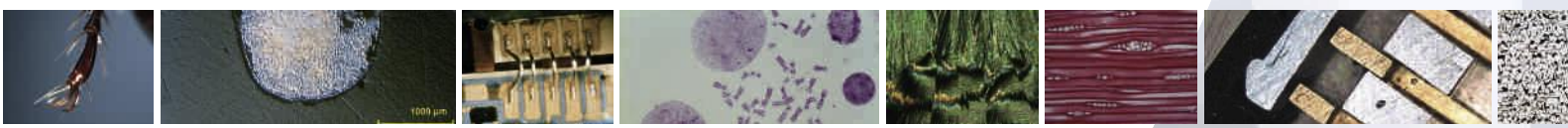


Read access via Intranet or Internet (password protected)

Viewer

Nowadays an image database is more than just a storage place for photos; it is an information platform used to provide data throughout companies. This premise is supported by the **Viewer** licences for the dhs Image Data Base, which are available in graduations of "up to 5 users", "up to 15 users" and "16 users and more" (company licence). These allow read access to the databases centrally stored in the corporate network. Images in the original resolution can be displayed, printed, sent to the Windows™ clipboard, exported to your file system and you can also carry out searches in the database.





Acquisition

Images are created in various ways. In order to open up your database to as many image sources as possible, you need to have extensive interfaces and, of course, to master all the standard import and export standards – as well as the dhs Image Data Base. Analogue and digital microscope cameras, scanners, consumer digital cameras, light microscopes, stereo microscopes and electron microscopes, reprostands, x-ray equipment, microprobes, interferometers and, of course, the support of all conventional image data formats (such as jpg, bmp, tiff, gif, png, psd and many more.) offer you every option.

Cameras

Many different image sources are available for direct connection to the dhs Image Data Base. The assurance of as close a connection between the used cameras and the image processing software as possible has proved to be the optimal method. Thus, dhs has been offering OEM cameras under **dhs-MicroCam** name for years. These are "state-of-the-art" digital microscope cameras made by renowned German manufacturers, which have been specifically further developed in collaboration with us according to meet requirements in the microscopy segment. There is an appropriate device in a different resolution, in colour or b/w and, last but not least, to suit different budgets – and the dhs-MicroCam family is always growing!

Image Support

In the internally programmed drivers, the so-called **Image Support** modules are provided in the standard user interface with all the important parameters to allow the user to set up the live images of your microscope camera, thus allowing exposure time, brightness, contrast, colour saturation, gamma values, white balance, shading correction, etc. to be ergonomically controlled from the PC. Image sources already available to the customer, e.g. analogue CCD cameras can usually be reused. Thus, of course, Image Support modules are also available for frame grabbers, video converters and Twain sources.

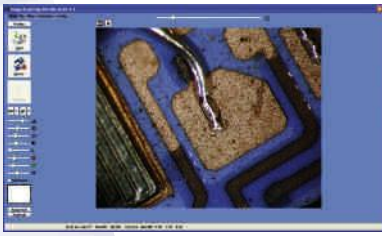


Photo Transfer

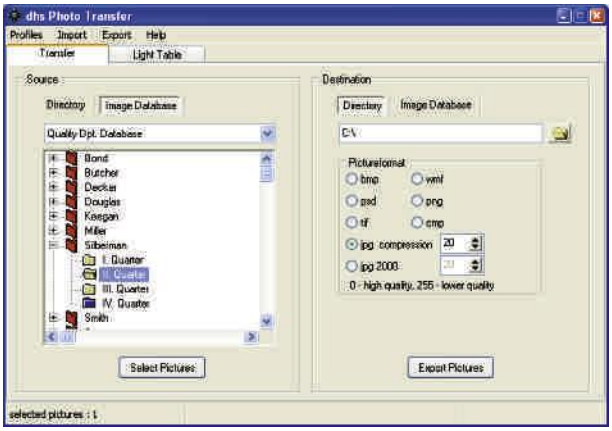


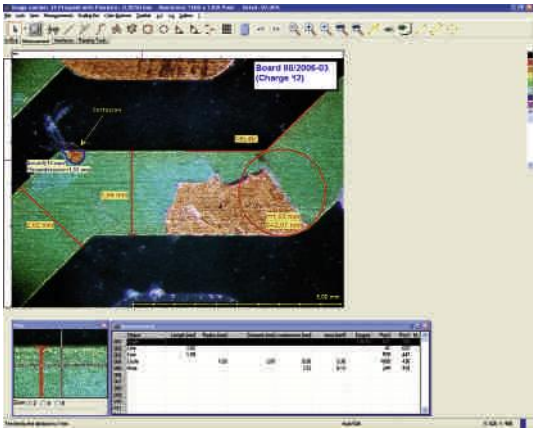
Photo Transfer is a module that has been explicitly programmed for digital consumer cameras: This allows internal camera data to be read out via the EXIF standard and input directly into the image database. However, this module is also a reloading point for images one would like to transfer in larger quantities from A to B, e.g. from a CD-ROM into an image database, from an image database onto a server drive, or from a camera onto a hard disk, etc. etc. etc. On request this can also be while simultaneously compressing and converting the data format. In addition, one can also automatically import SEM data (TIF headers).

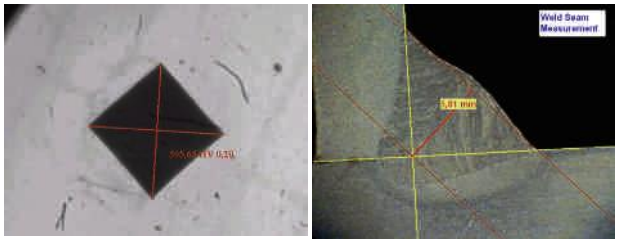
Processing

In the Processing product group we provide you with a large number of extension modules, with which your images can be evaluated, measured, optimised and combined. The following pages will show you the ways in which modern imaging software can extract all kinds of information from your images.

Measurement Tool

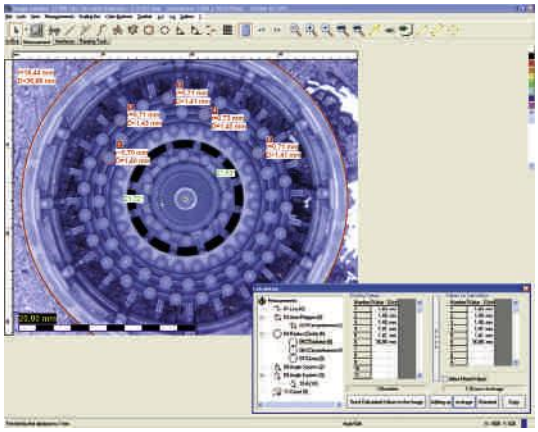
Measurements in 2D constitute a standard image processing application. With the **Measurement Tool** we place an extremely mature multi-layer tool in your hand, which you won't ever want to put down again. All two-dimensional measurement specifications can be covered in this way: distances (single and polygonal), areas (freehand or geometric), radiuses and diameters, angles (3 and 4 point), perpendiculars dropped – supplemented by helpful features such as measurement value preview, ruler fade-in, grid, counting function, measurement value calculator with MS Excel™ interface, and much more. Special functions are also integrated, e.g. the measurement and evaluation of microhardness identations (including development curve and data migration in MS Excel™) as well as extensive options for weldseam measurement incl. A dimension. Captioning options, such as texts, arrows and drawing objects are of course available.





There is no question that an important prerequisite for precise measurement is a correct system calibration. During the process you yourself determine the measurement unit, the decimal points and the calibration designation, as all this will be stored on the PC and can be permanently reused for measurements. The unique calibration process (per image source and optical enlargement) takes no time at all and is simply assigned to your images for later measurements – thus saving a great deal of time!

Naturally, the generation of a scalebar in various display formats is a matter of course for us. The use of a multilayer technology ensures the editing, protection and retroactive adaptation of annotations (e.g. size and type of font, line thicknesses and colours). The Measurement Tool is available in standard and light version.



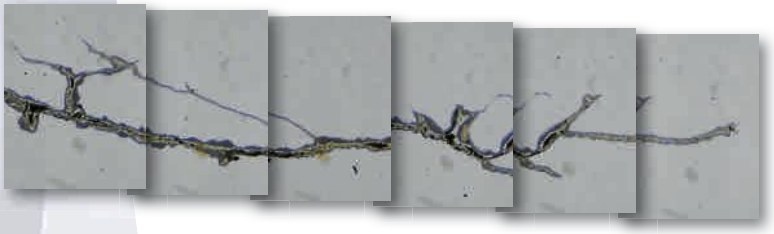
Processing

Combining images in X, Y and Z axes offers you completely new options! Automatically combine several individual photographs taken in overlapped sequence into panorama images, or generate photos with unimagined depth of field by merging several focus levels of a microscope preparation by means of software. The dhs Image Data Base provides results, which would otherwise be denied to you, e.g. due to a small field of view or a poor depth of field. Join us in exceeding your physical limits!

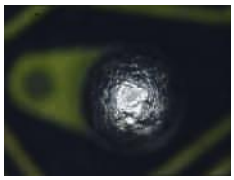
Panoramic Image

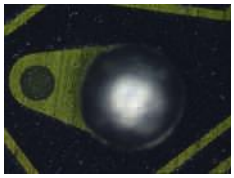
Would you like to display an entire sample as an overview screen, but still show the details? These are requirements that would seem to contradict one another. The solution to this is the **Panoramic Image** module, which allows you to combine individual photos taken in overlapped sequence in X and Y axes like a panorama or mosaic. Thanks to innovative software algorithms the process is even automatic!

Using the example of a crack in a casting, we have impressively displayed the above here: even at the lowest optical enlargement only 1/6 of the crack can be displayed within an image. Lateral processing of the sample allowed several partial photos to be made, which were then combined via software.

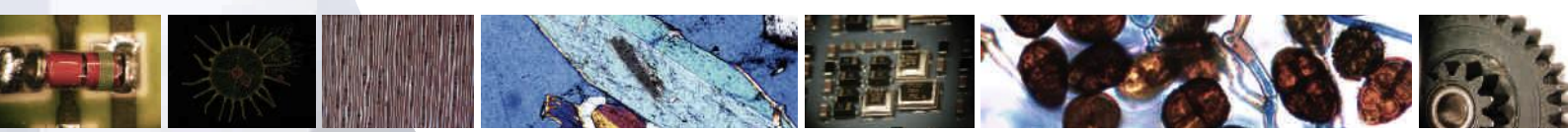


Sharpness Reconstruction





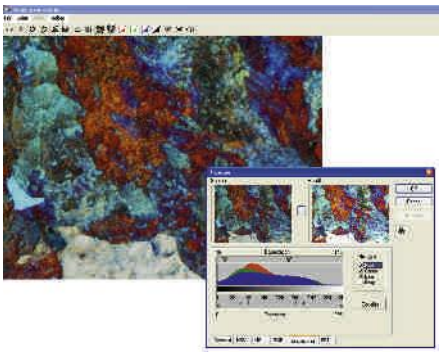
A possibly even more serious problem for almost anyone who is using microscopes, is the poor depth of field, which results in samples with non-even surfaces. When looking through the ocular it becomes clear that frequently only a small partial area of the image can be focused, extending the sample in the Z axis inevitably leads to blurred images. These can only be eliminated via a clever imaging solution, in that one combines several photographs from different focus levels with each other. In the **Sharpness Reconstruction** module we offer you the option of doing this with both single-beam and stereo microscopes. In so doing the software fully compensates for the lateral image offset!
Due to the use of various calculation algorithms this module is equipped for each image acquisition situation, whether reflected or transmitted light, with previously stored images or for the immediate result control in the “live mode”: In a very short time you will get quite astonishing result images, which would never have been able to be generated at the microscope itself.
The above example of a semi-spherical soldering point visualises the mode of operation or a before/after comparison very impressively.



Processing

Image processing or optimisation supports visual or image analysing evaluations, for trials in the biomedical area as well as in material science applications. On this side you can read about the modules we will be using to resolve your problems.

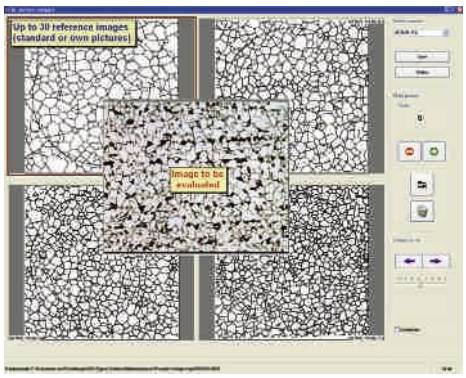
Image Manipulation



The image quality is significantly determined by the settings when the photo is taken. The perfect framework conditions do not, however, always exist, meaning that you may have to manipulate the image. Or perhaps you need algorithms, such as blur, edges, sharpen, emboss or median, to work out the image contents and optimally display interesting details.
To this end the **Image Manipulation** module offers the above-cited professional tools, as well of course as retroactive image adjustments where brightness, contrast, colour saturation and gamma are concerned. Fast Fourier Transformation, work in various colour ranges (e.g. HSV, HSL, RGB) as well as the option of creating one's own filters and storing them in macros are available to power users.

Metal Sections

A visual comparison of one's own micrographs with standards, so-called reference series, is one of the standard applications in the metallography laboratory. The **Metal Sections** module was developed in order to accomplish this much more ergonomically than previously. The stored or live microscope camera image is centrally displayed on the PC monitor, meaning that it can be evaluated without fatigue, even in discussion with several colleagues. However, it is not only for metallography standards that this dhs module can be used. Instead, many customers also use it to conduct production-accompanying final inspections, as one can display not only reference series' images on the screen, but also any photos from one's own database. Thus a good/bad evaluation of parts in the form of a 100% visual inspection is perfectly possible.



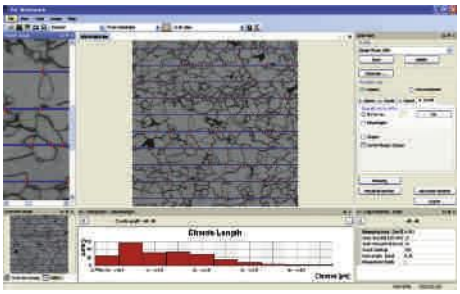
Analysis

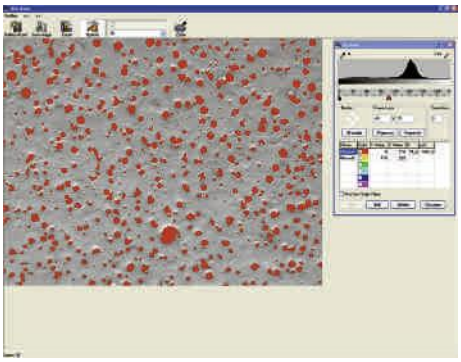
Image analysis is becoming more and more important. Software controlled, fully automatic and timesaving evaluation of image contents is the highest art form of imaging. At dhs this area is a main focus of the product portfolio, which is why practically oriented tools offering reliable and reproducible results in line with efficient modes of operation have been developed for many years. Analysis modules from dhs are the solution for you, thanks to their structure that is flexibly adjustable to meet individual customer requirements!

Area Detection

The **Area Detection** module serves to analyse materialographic micrographs and, especially, to quantitatively determine phases. Greyscale detection allows up to 6 different material phases to be evaluated via the integrated layer technology (completely or in a pre-selected frame). The upper and lower threshold can be easily set by the user, e.g. via pipettes with which one can directly transfer grey values from the image. All layer labelings are freely selectable and all software settings can be stored in user profiles – one click suffices to change the operation type. Of course, MS Excel™-based automatic report generation incl. graphic processing is also included.

All parameterisations can be stored in user profiles to enable optimal reproducibility.



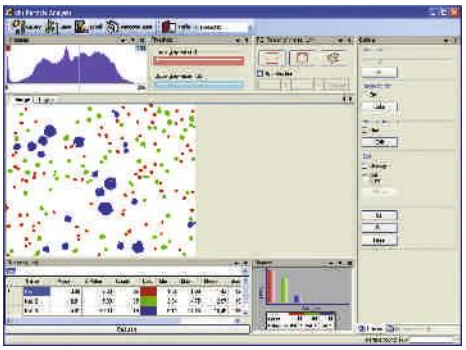


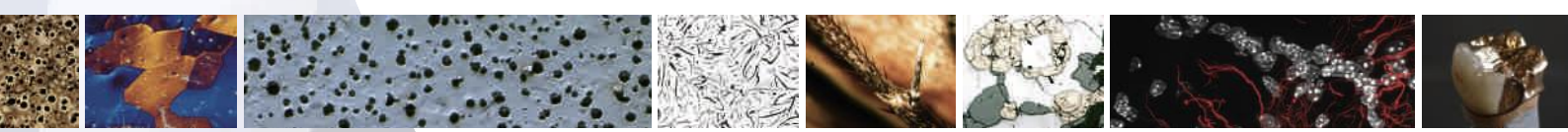
Particle Analysis

The recognition of particles, pores, inclusions and objects is the task of the **Particle Analysis** module. A user-predefined greyscale spread selects the relevant ranges and then the analysis software scans the image. All important measurement values are ready within seconds, e.g. quantity, dimensions and distribution of objects – which, by the way, can also be classified according to their form! Helpful features are a freely adjustable categorisation, miscolour visualisation, as well as automatic diagram and report generation (MS Excel™). Anyone working frequently with different samples and/or acquisition conditions will also be glad of the option to store user profiles in this module.

Grain Size

The determination of **Grain Size** according to EN / ISO 643 and ASTM-E112 is a frequent task in the metallurgy segment. To this end, dhs has developed a solution which is based on the “line intercept method”, and which supplies extensive measurement values in addition to the grain size “G”, including, inter alia, area, circumference, diameter and quantity of the detected grains in the micrograph. Graphic processing, categorisation and histogram are also included, as well as a migration of all data and measurement values into the dhs Image Data Base for data storage and, if necessary, reporting at a later date.



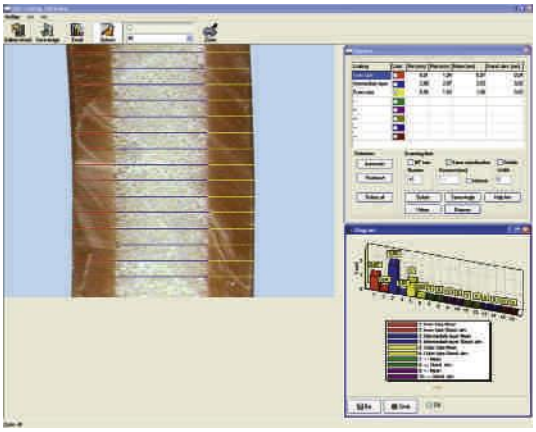


Analysis

Today modern industrial needs are characterised more and more by cost and time pressures. For manufacturers and suppliers that means producing more cost-effectively, at a quicker rate and in better quality. The dhs Image Data Base helps you to monitor your products' quality in a cost-saving manner, quickly and easily. Standard user interfaces help you to achieve the desired result while still retaining the highest precision level, as does our philosophy *"As few clicks as possible"*! Easy handling and high-end image analysis: this is no contradiction in terms at dhs.

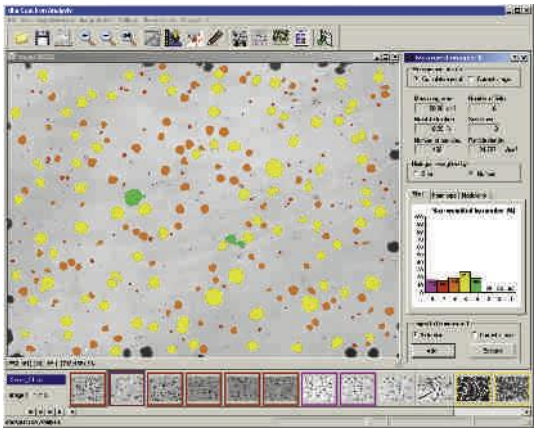
Coating Thickness

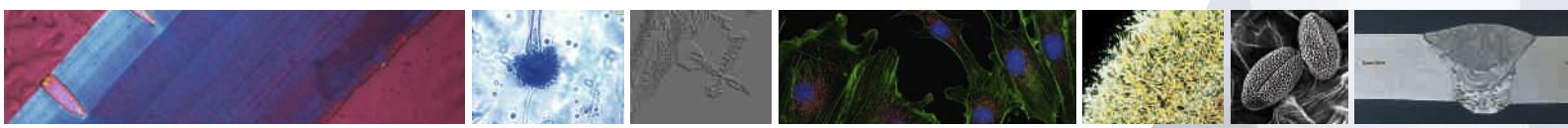
The measuring of layers, e.g. lacquering, galvanic layers, hardenings, multilayer foils, etc, was previously associated with a great deal of manual work. The **Coating Thickness** module allows you to make considerable reductions in the evaluation times, as up to 8 layers can be measured in no time at all, with borders being able to be defined either automatically or manually. Quantity, distance, orientation and visualisation of the measurement lines are freely adjustable. And all the important data, such as highest/lowest measurement value, average value and standard deviation are available in table form and graphically. A push-button report in MS Excel™ perceptibly increases the user comfort even more.



Cast Iron Analysis

Foundries require reliable statements on the composition and properties of your products and materials for their quality assurance. In so doing – in addition to various destructive tests – image analysis is playing an increasingly important role. The dhs **Cast Iron Analysis** is used to analyse all the important parameters of cast iron materials taking into account the relevant standards (EN / ISO 945, ASTM-A247): graphite content, ferrite/pearlite ratio, size classification, determination of number and density of the graphite particle, nodularity determination according to the Sintercast formula and form classifier. In addition to the features contained in this *Standard* version, the *Advanced* version also offers an innovative arrangement classifier for the evaluating of flake graphite in cast iron and determining the quantity of flake graphite and the size classes thereof (for D- and E-graphite too). This classifier can "learn", which means it can be "taught" to accommodate all your requirements!





dhs Image Data Base

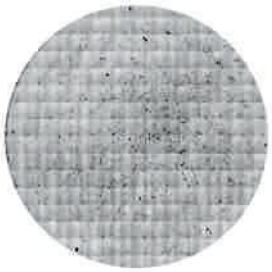
Analysis

Nowadays parts, devices and components are becoming smaller and smaller, are constructively exhausted and are subjected to ever-increasing stress, thus increasing the risk of malfunctions or failures, caused by particles of dirt for example. Product cleanliness is thus more important than ever now, which is why EN / ISO or factory standards increasingly require suppliers to systematically provide evidence of the purity of their products – in the form of a so-called Cleanliness Analysis. To this very end we have launched a complete solution onto the market in the shape of the dhs-Cleanalyzer.

dhs-Cleanalyzer

The so-called **Cleanliness Analysis** is a technically mature and above all timesaving method of determining the degree of pollution of parts and components. It is increasingly replacing the previously used gravimetry, which is much more complex as part of the daily routine. Many companies, whether in the automobile, pharmaceutical or other industries, today require that their suppliers provided detailed evidence of the cleanliness of the parts according to precisely defined framework conditions. In so doing important standards are VDA (Bd. 19) and ISO 4406 / 16232 (inter alia). The remaining workflow in such an analysis is as follows:

a) The product is cleaned using a washing liquid
b) A precisely determined amount of this liquid is then filtered
c) The residue (particles) located on the filter is evaluated via image analysis.



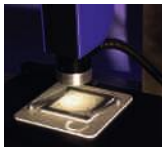
This is where the **dhs-Cleanalyzer** now comes in: it evaluates your filters – whether paper, Teflon or polyester grid – semi-automatically, or fully automatically, depending on the probe throughput and/or frequency.

With the three versions

- **Advanced (50µm)**
- **Professional (5µm and 15µm version)**
- **Stereo (5µm / 25µm combined version)**

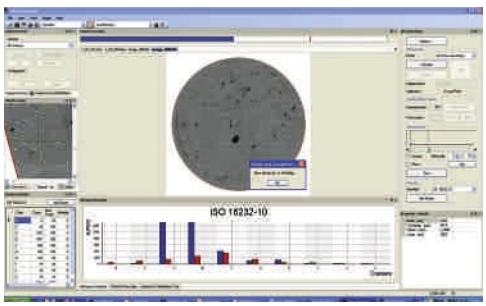
dhs offers the appropriate solution to meet every need and every budget. In a variety that has yet to meet its match on the market!

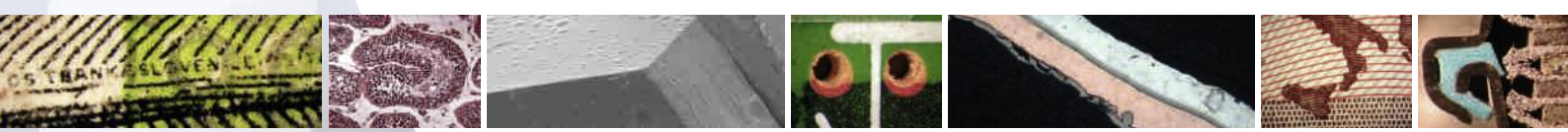
The appliances in the product family all comply with the standards, offer maximum ease of use, and contain precision components for maximum repeatability and precision in measuring.



The **Stereo** version in particular - the only product on the market - offers you tremendous advantages: the combination of stereo 3D observation (binocular) with the measuring precision of a high resolution light microscope.

Innovative LED lighting technology combined with polar filters, image-optimising algorithms integrated in the software and automatic analysis sequences result in an optimised ergonomic working process that you will soon learn to appreciate in daily use. From the interactive **Advanced** version (for minimum insertion and/or particles ›50µm), the **Professional** model (for high probe insertion and/or smallest particles, 5µm or 15µm) to the **Stereo** high end device (combination 5µm/25µm): you'll always find the perfect system at dhs!
All versions offer the option of integration in the dhs Image Data Base, well-established and appreciated on the microscopy and imaging markets for over ten years now for its easy operation. Furthermore, every appliance comes with the high-performance dhs-MicroCam 1.3 digital camera, which provides brilliant images as the basis for analysis. We can also provide the matching PC systems and, of course, an on-site commissioning service.





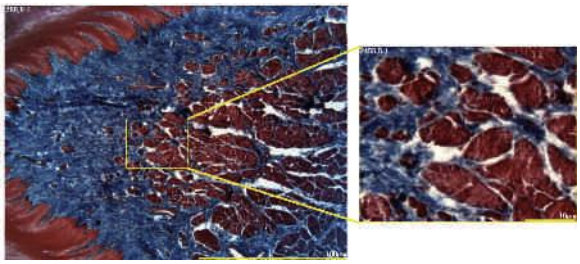
Documentation

dhs Image Data Base

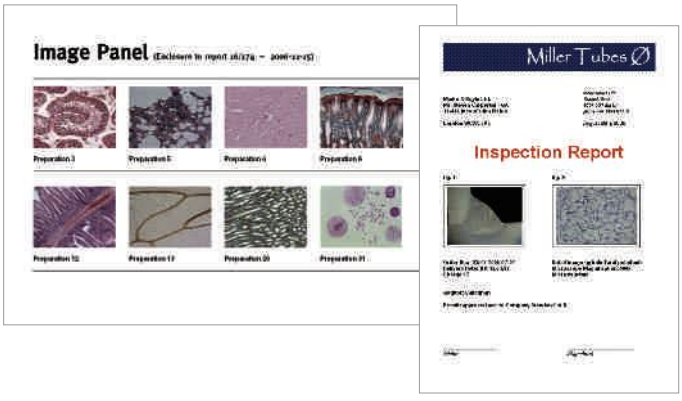
Tests, evaluations and analyses are almost always documented at the end of the workflow. One department provides the other with a testing report, the supplier encloses a quality log with every goods consignment for its customer or the assessor prepares an expertise including photos and figures from its dhs Image Data Base. This "paperwork" is often a necessary evil, but one for which one does not like to sacrifice the qualified staff's valuable time, which is why the dhs Documentation product group contains helpful modules for reporting and communication.

Automatic Reporting

The individual production steps of image acquisition, archiving, processing and analysis are frequently only taken in order to subsequently create clean project documentation. Thus, the **Automatic Reporting** module is of great significance to most clients. When reusing any existing company forms, including integration in the existing corporate structure, and primarily when using the globally applicable standards – i.e. of the Microsoft Office™ product family – an efficient tool is available to you. The close link of this usually already existing and well-known office software to the dhs Image Data Base opens up many paths of communication. Reports created in MS Word™ are accepted everywhere due to the standard format, known problems (such as e.g. files that are much too big) are, however, eliminated when using this module! Both form-based routine reports, as well as image



tables, display detail (zoom, s. fig) or individual documents are created in a matter of seconds! Up to ten individual work steps are reduced to 1-2 mouse clicks.



Communication

Should you opt for the **Communication** module as an additional supplement to the Automatic Reporting module, you will lastingly optimise your workflow even more, as this allows images and reports to be directly communicated via eMail all over the world in seconds, and without any complicated reformatting, converting and compressing steps needing to be taken. You will be amazed at the ease with which you can generate future reports or logs and immediately forward them to colleagues, customers or suppliers – with no detours. Select the images and form, press the button and that's it! Starting MS Word™ (must be provided by the customer), loading the form, inserting the images and texts, generating the report incl. optional PDF creation, starting MS Outlook™, generating a new eMail and attaching the document – everything is fully automatic and accomplished in a few seconds. And that leaves you more time for more important things!

Interested?

Have we managed to rouse your curiosity and would you like to find out more about the dhs Image Data Base?

- Visit us on the Internet at www.dhssolution.com
- Request our info folder including extensive detailed information and individual brochures.
- Would you like an individual software and hardware presentation at your company? Contact either our salespartners or us to arrange a date.

Thank you

dhs thanks the many thousand users who have made valuable contributions to the permanent further development and optimisation of this software via their committed feedback. Thanks to them the dhs Image Data Base is one of the most practically oriented applications on the market – many thanks!

We're always there for you!

The dhs head office is located in central Germany, just a stone's throw away from the Rhein-Main and Ruhr Basin economic centres. However, at the same time our location is so peaceful and in such an attractive landscape on the edge of the Westerwald, that our team is able to devote its full concentration and commitment to further developing the dhs software and creating new ideas.

Proximity to our customers and partners is important to us. In addition to our central location we also exhaust all options offered by modern communication technology, in order to ensure that we are there for you on a permanent and reliable basis.

Detailed directions of how to reach us can be sent to you on request via eMail or can be obtained directly via our website at www.dhssolution.com.

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