

SPM Software Version History

Software Version 3.10.3

Date: March 2022

New Features

1. Monitoring now supports all signals
2. DriveAFM feature package
3. Dual vibration mode operation

Corrections

1. Ribbon bar clean-up
2. Fixes for examples and programmer documentation
3. Several bugs fixed

Software Version 3.10.2

Date: November 2021

New Features

1. Extended DriveAFM support
2. DriveCam support
3. Extended CX Controller support
4. HV A201 support
5. COM access to laser controls

6. Tilt switch enabled in DriveAFM scan head

Corrections

1. Increased stability
2. Improved default settings
3. Several bugs fixed

Software Version 3.10.0

Date: June 2020

New Features

1. CX Controller Support v1.0
2. C3000i Controller Support (former C1000)
3. Accessory Interface v2.0 Support
4. Nanoscience Trax OEM EOL: Now support in Nanosurf Naio stock version
5. Integrated Cytosurge FluidFM Pump Support

Corrections

1. 13 bugs were fixed

Software Version 3.8.8

Date: June 2019

New Features

1. Camera overlays representing scale, fps and zoom factor indicators for FlexCamera, Naio, Nanite and CoreAFM (The Imaging Source based cameras)
2. Stage: “Move” and “Close” button for MoveTo Dialog
3. Stage: Configurable approach axis move prior to moves of other axes
4. Stage: If AFM is approached stage system doesn't allow any moves
5. New algorithm for setting free amplitude in dynamic force mode

Software Version 3.8.7

Date: May 2019

New Features

1. Accessory Interface
 - DIMO Support
2. Stage: Position zeroing per axis
3. Stage: MoveTo Dialog allows fixed unit prefix

Corrections

1. 3 bugs fixed

Software Version 3.8.6

Date: April 2019

New Features

1. C1000 SPM Controller Support

2. Frequency Sweep Abort
3. New Nanosurf Logos

Corrections

1. 10 bugs fixed

Software Version 3.8.5

Date: December 2018

New Features

1. CoreAFM: Continuous Approach

Corrections

1. 12 bugs fixed

Software Version 3.8.4

Date: September 2018

New Features

1. Scripting Interface:
 - extend COM ProxyApplication to set/get GalleryHistoryFilenameMask() and GalleryHistoryFilenameIndex()
2. Allow imaging with 1 line for Naio, SPM S and Easyscan2 controllers

Corrections

1. 12 bugs were fixed

Software Version 3.8.3

Date: March 2018

New Features

1. Scripting Interface:
 - Extend ProxySpec Interface with GetMin/SetMin and GetRange/SetRange by DIM of a databuffer
 - Extend ProxyScanHead for controlling the laser

Corrections

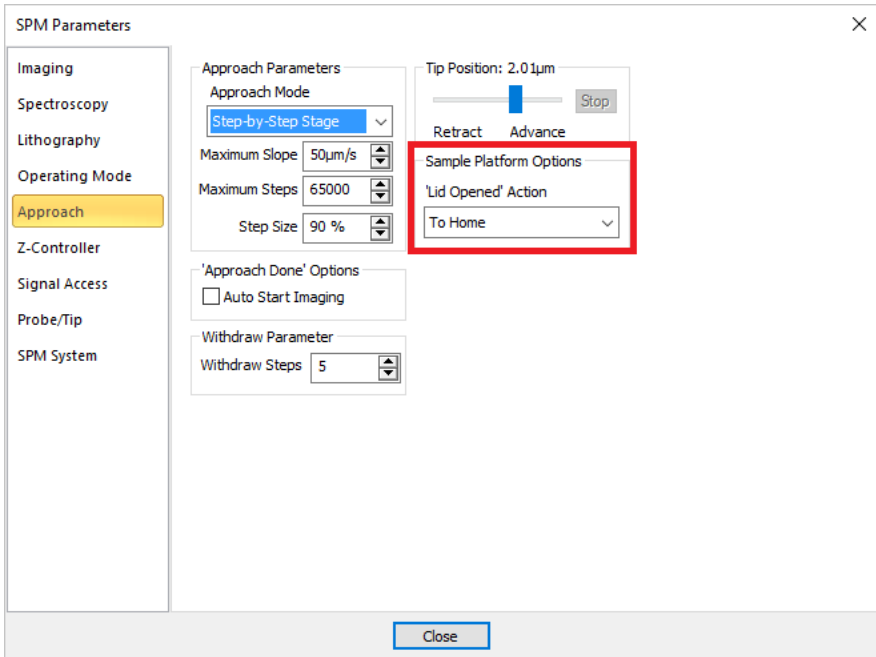
1. 14 bugs were fixed

Software Version 3.8.2

Date: January 2018

New Features

1. *Sample Platform Options* allows users to select the default action to perform when the scan head lid is opened.
 - Available for the CoreAFM platform



Corrections and Changes

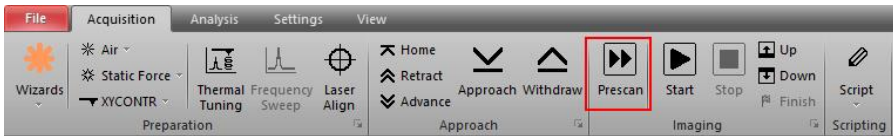
- 14 bugs were fixed, notably:
 - Incorrect Lithography Start/Stop handling for scripting has been fixed
 - Crash when changing video camera while Laser Align Dialog is open has been fixed.
- Some GUI improvements were implemented to better represent the function set of the CoreAFM.
- Video Camera settings are now stored in a separate file instead of in the parameter files.

Software Version 3.8.1

Date: July 2017

New Features

1. *Prescan* allows users to quickly evaluate regions of interest
 - Available for Naio, SPM S and Easyscan2 platforms as well as for C3000 and CoreAFM.



Corrections

1. 23 bugs were fixed
2. 7 improvements were implemented, the most important of which are:
 - Spectroscopy Phase state is now available in the API.
 - Monitoring panel is now a dockable window.

Software Version 3.8.0

Date: April 2017

New Features

1. *SpikeGuard*: Automatically rescan disturbed measurement lines.
2. Introduction of language invariant codes in error messages.

Corrections

1. 18 bugs were fixed.

Software Version 3.7.3

Date: Feb 2017

New Features

1. New hardware support:
 - Full CoreAFM and AFSEM support.

Corrections

1. 8 bugs were fixed.

Software Version 3.7.2

Date: Dec 2016

New Features

1. New hardware support:
 - Basic CoreAFM and AFSEM support.
 - Support for new NaioAFM camera.
2. Fail safety for the camera system.
3. Improved step-by-step approach procedures.
4. Inversion feature of user outputs.

Corrections

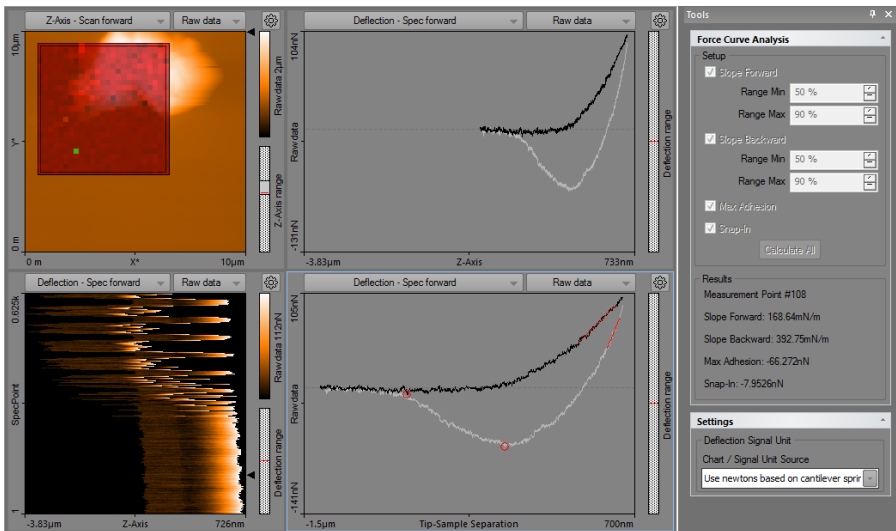
1. 11 bugs were fixed.

Software Version 3.7.1

Date: June 2016

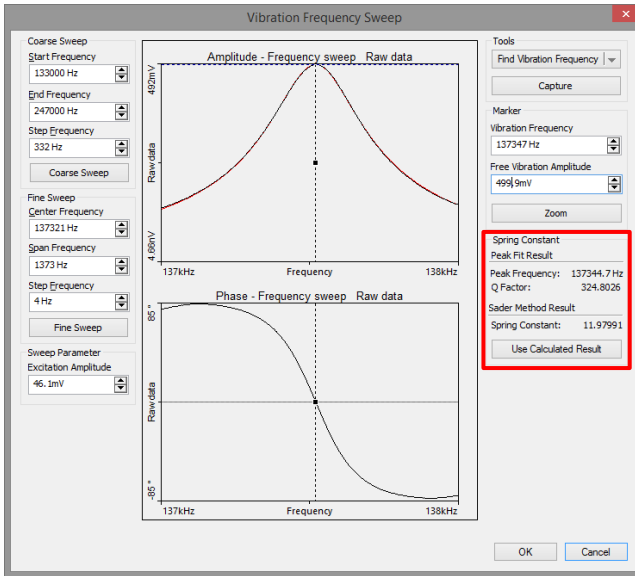
New features

1. Spectroscopy Online Analysis allows setting up force curve analysis functions that produce results as each force curve is measured.
 - Immediate inspection of numerical analysis results.
 - Graphical representation of the analyzed parameters in a Force Curve graph.
 - Producing a color map of analyzed parameters during the measurement.

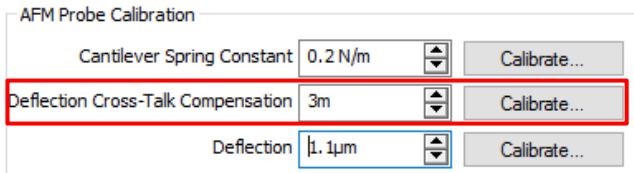


These features are only available when Advanced Spectroscopy has been unlocked with a valid access key.

2. Additional calibration functions:

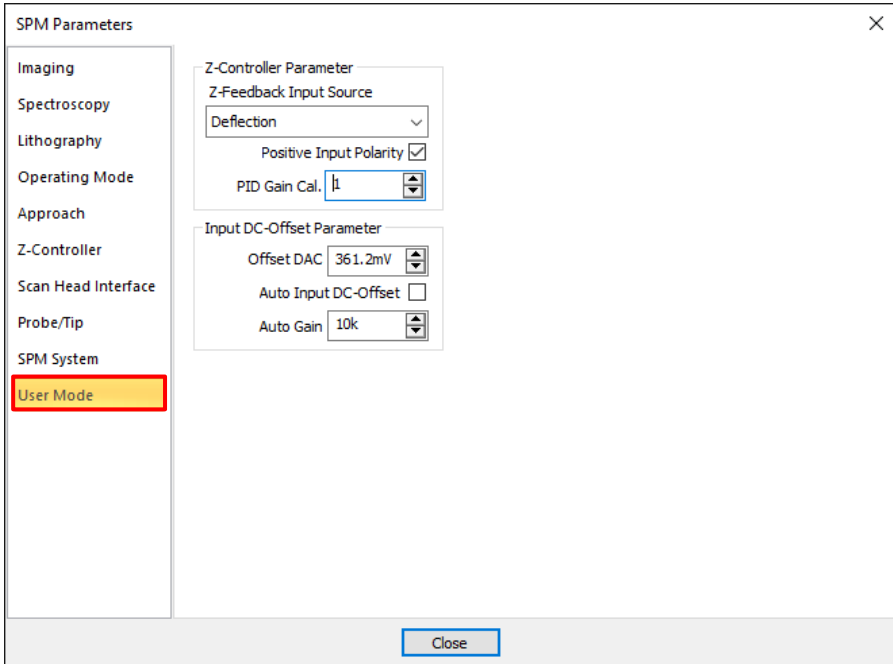


- Cantilever Calibration via Frequency Sweep for all platforms.
- Deflection Sensitivity Calibration enabled for the EasyScan2 and Naio platforms.



- Deflection Cross-Talk Compensation
3. Z-Axis Closed Loop operation when Z-axis should keep a constant position.

4. New operating mode: User Mode, do Z-Feedback on a user selected input User Channel.



5. Support for stage Attocube ecc100 stage controller

Changes

1. The Spectroscopy Wizard even better supports the user to setup spectroscopy parameters for specific experiments now.
2. The whole Spectroscopy procedure was hugely improved in terms of quality and speed:
 - Switchover times between phases below 100 μ s
 - Improved baseline correction
 - Deflection Cross-Talk Compensation

- Filtering of Setpoint Values

Corrections

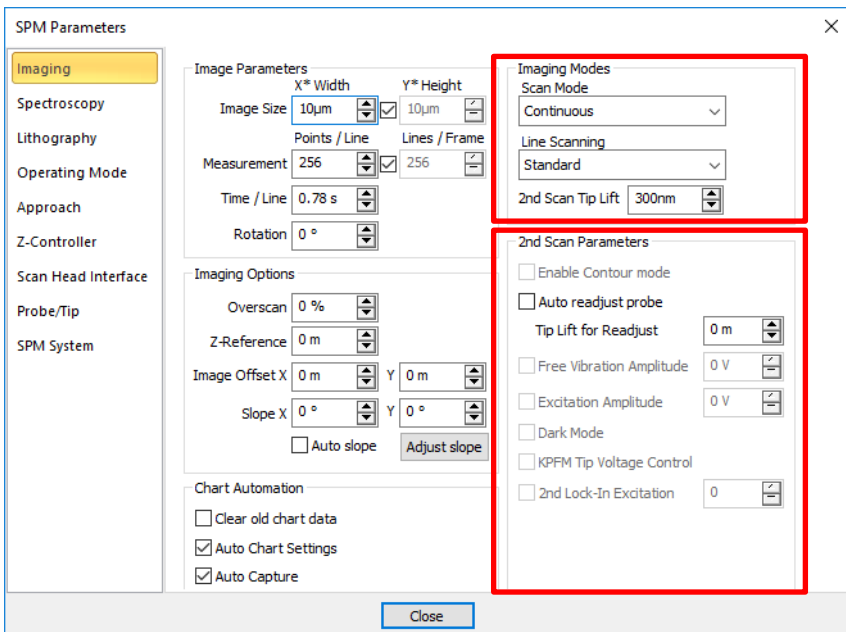
1. 59 bugs were fixed.

Software Version 3.6.0

Date: December 2015

New features

1. The Imaging Modes section of the Imaging page of the SPM Parameters dialog has been updated to incorporate new Line Scanning options (all controllers) and a 2nd Scan Parameters section has been added to allow new modes and different parameter settings for the second scan (C3000 controller only).



To use the 2nd Scan Parameters section, purchase and activation of the C3000 Advanced Imaging option is required.

2. Support for the LStep stage driver has been added.

Changes

1. As of control software version 3.6, Windows XP is no longer supported! You will need to use Windows Vista or later.

Corrections

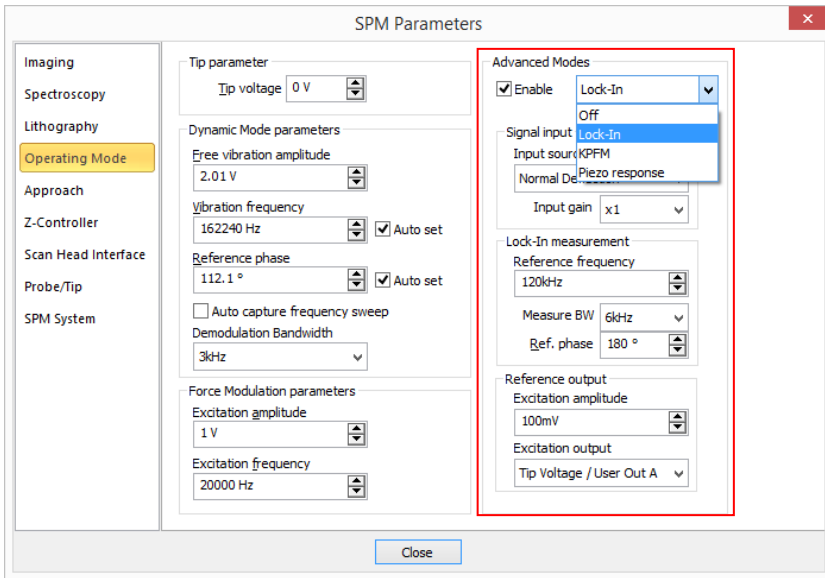
1. C3000: The accuracy with which the C3000 control software utilizes scan head calibration file data for background subtraction has been improved for the LensAFM, NaniteAFM, and Easyscan 2 AFM scan heads.

Software Version 3.5.0

Date: April 2015

New features

1. C3000: New Advanced Modes section in the Operating Mode page of the SPM parameters dialog for measuring and controlling modulations or frequencies in addition to the standard signals during imaging or spectroscopy: Secondary Lock-In, KPFM and Piezoresponse Force Microscopy.



2. C3000, Easyscan 2: Drivers for automated stages have been integrated into the SPM control software. Different stage hardware can now be used in parallel and multiple axes are supported.
3. C3000, Easyscan 2: A Manual Move section has been added to the Stage panel, and the Batch Manager has been integrated into the SPM control software as a new control panel. The Stage Control option (see below) is necessary to use this new functionality.
4. C3000: The set of software options (upgrade packages) has been redesigned and new features have been introduced:
 - **Advanced Modes:** Add a general Secondary Lock-In. This Lock-In measures modulated signals (e.g. higher harmonics) and forms the basis for KPFM and PFM.
 - **KPFM Workpackage:** Special KPFM Operating Mode Panel
 - **PFM Workpackage:** Special PFM Operating Mode Panel
 - **User Signal I/O:** Add analog User In and Out, Digital Sync, External Clock

- **Stage Control:** Activates integrated automated stage control with Manual Move, Batch Manager and Step-By-Step-Approach.
 - **Cantilever Calibration:** Adds cantilever spring-constant calibration and deflection sensitivity calibration functionality.
5. C3000, Easyscan 2: Step-by-step approach can now be performed using an automated stage (e.g. ATS 204) for Z-movement.
 6. Easyscan 2: Full support for FlexAFM 5 scan heads.
 7. A new Service group has been added to the Settings tab of the SPM control software to enable access to the Log panel (debugging information).

Changes

1. The “Start”, “Stop”, “Pause” and “Resume” buttons have been redesigned to improve usability:



Corrections

1. C3000: The error, that small scan ranges could be distorted with different time/line values has been fixed.
2. The error, that the software would get stuck during startup, has been fixed.
3. The error, that the approach motor movement could not be stopped, has been fixed.
4. Extensive software code restructuring has improved the general software stability.

Software Version 3.4.0.8 and 3.4.0.9

Date: December 2014

General corrections

1. The error, where the Monitor Output BNC was not working correctly, has been fixed.
2. The error, where the User Input 1 was not measuring an input signal, has been fixed.
3. The error, where the Spectroscopy Map was measured with flipped X/Y Positions, has been fixed.
4. The error, where the Spectroscopy X/Y-Move Speed was not set correctly, has been fixed.
5. The error, where the NaioAFM Camera was not detected, has been fixed.
6. The error, where the software crashed after reconnection of a video camera during runtime, has been fixed.
7. The error, where the dynamic amplitude was scaled incorrectly, has been corrected.
8. The error, where the signal channels in Lateral Force Spectroscopy were wrong, has been corrected.
9. Multiple problems of the XY-Chart have been fixed.
10. Multiple problems in the Thermal Tuning Dialog have been fixed.
11. Multiple problems storing the head calibration file have been fixed.
12. The error, where some old .EZD data files could not be opened anymore, has been fixed.

Software Version 3.4.0

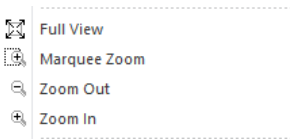
Date: August 2014

General new features

1. There are now separate buttons for Start, Stop, and Pause in the Imaging, Spectroscopy, and Lithography sections of the Acquisition Tab of the Ribbon, and the button now display the current state. The new Pause button can temporarily interrupt a measurement process. When resumed, the measurement continues where it left off.



2. Line charts now support a graphical zoom by mouse. The pop up menu (activated by right-clicking the chart) now has the following new items:



3. A new chart display type is available: XY line chart. This chart type plots two measured data signals against each other.

New features for the C3000 controller

1. Very large spectroscopy maps are now possible. The number of points is only limited by the available PC memory.
2. The execution speed of spectroscopy maps has been increased by reducing communication and other overhead times. The memory consumption for large spectroscopy maps has also been reduced.

3. The Thermal-Tuning dialog now has a capture button to store the measured frequency spectrum as an .NID file.
4. The Thermal Tuning Dialog now displays [meter rms/sqrt(Hz)] as unit in the power spectrum instead of [arb].

General changes

1. The .HED file version number was increased, because new scan head features are now supported. Therefore, these calibration files are not backward compatible with older software versions.

General corrections

1. The error, where changes of Deflection Sensitivity and Spring Constant in the SPM Parameter Dialog were not correctly updated, has been fixed.
2. The error, where Deflection sensitivity was not always displayed in [m] in the .NID file, has been fixed.
3. General internal improvements were made to software responses times on slow computers.

Software Version 3.3.0

Date: Mai 2014

New features for the C3000 controller

1. Full support for the following standard operating modes: Phase Contrast, MFM, EFM, Lateral Force, Force Modulation and Spreading Resistance
2. New integrated Kelvin-Probe-Microscopy Operating Mode: Modulation generator, Secondary Lock-In and Bias Controller for AM-KPFM. Available with active "Signal Modulation" option. Open "Help >> TechNotes >> TN00844" to learn how to setup and use this mode.

3. New Macro command execution engine on controller. Available with active “Scripting Interface” option.
4. New Lithography mode “Z-Modulation” for pattern writing. This mode is only available with an activated “Advanced Lithography” option.
5. The number of available signals in the Data Monitor panel and for the Monitor BNC outputs has increased.

New features for the Easyscan 2 and Naio controllers

1. New Z-Axis Idle-Mode parameters are available through the newly added System page in the SPM Parameter Dialog.

Changes for the C3000 controller

1. The voltage setting of the dynamic amplitude used for the Dynamic and Phase Contrast operating modes now has to be set 10 times higher to get the same physical cantilever oscillation amplitude as in previous versions. This means that the user has to set the “Free vibration amplitude” 10 times higher than in previous C3000 software versions to get the same results. Also compared with the Easyscan 2 and NaioAFM control software, the voltage setting for the dynamic amplitude in the C3000 software should be 10 times higher to get the same result.

General changes

1. Some sections and parameters in the SPM Parameter dialog were rearranged or placed in other panels to better reflect features common to and different for the C3000 and Easyscan 2 controllers.

General corrections

1. More buttons in the ribbon and in dialogs are now disabled during ongoing controller processes in order to inform the user and to prevent conflicting user actions.

2. Improvements were made to increase the general responsiveness of the user interface.

Software Version 3.2

Date: 2013

New features for the C3000 controller

1. Initial support for FluidFM and ARTIDIS systems.
2. The deflection sensitivity calibration wizard and a cantilever spring constant calibration via thermal tuning measurement are now supported. These features are only available with an activated “Advanced Spectroscopy” option.

Software Version 3.1.1

Date: February 2012 (rev. 0)

New features

1. The cantilevers CONTSCR and XYCONTR have been added to the cantilever type list.

Changes

1. Lateral Force is now only shown as an available operating mode when a FlexAFM scan head is attached to the Easyscan 2 controller.

Corrections

1. The Image Gallery no longer freezes when Enter or ESC is pressed.
2. A problem where Image Offset values were cleared upon clicking the Capture button while in the Spectroscopy or Lithography tab was solved.

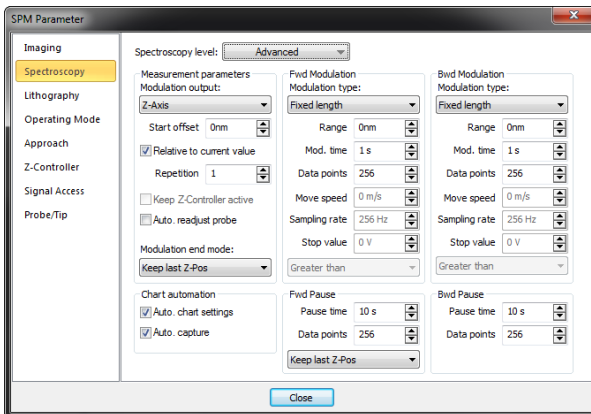
3. A problem where the analysis tool selection could cause the control software to crash has been solved.
4. Calculation of the optimal chart data range has been improved.
5. NaniteAFM scan heads operated on an Easyscan 2 controller are now detected and handled correctly by the control software.
6. Minor bug fixes.

Software Version 3.1.0

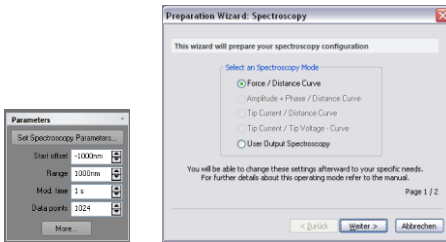
Date: July 2012 (rev. 0)

New features

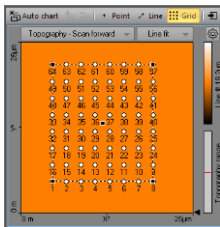
1. The Spectroscopy function underwent a major redesign. In the new Advanced level, it now supports many configurations for each phase of a modulation. Check the manual for details.



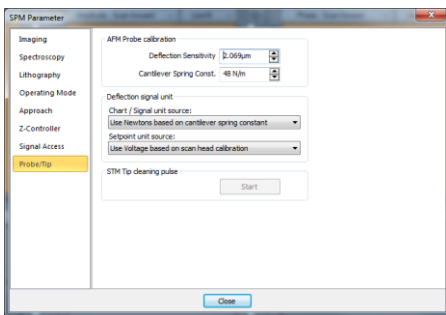
2. A new Spectroscopy Wizard prepares parameters:



3. The Spectroscopy toolbar now also has a Grid-Tool to define points:



4. The Probe/Tip page has been added to the SPM Parameters dialog. Check the manual for details:



5. Support for an extra DirectShow compatible Video camera has been added. See "Settings" >> "Controller".
6. The Easyscan 2 Controller now also supports the NaniteAFM scan head.
7. The Easyscan 2 Controller now also supports the Stage controller and the Batch Manager for executing automated measurements.

8. Support for the new SCU Stage driver has been added. See “Settings” >> “Controller”

Changes

1. The performance of the user interface has been improved by using a new graphic library. Also, the look and feel has been slightly adapted to new standards.
2. The performance of the gallery browser has been improved.
3. Improved Phase Calibration algorithm in Phase Contrast operating mode.
4. The Scripting Interface for the spectroscopy has been changed to reflect the new parameters.
5. The .NID file format has been improved to support the new spectroscopy data.

Corrections

1. Resource management has been corrected that could lead to an application crash after longtime scanning.

Software Version 3.0.2

Date: December 2011 (rev. 0)

New features

1. The automatic free vibration frequency search algorithm can now automatically increase or decrease the excitation amplitude during the frequency search depending on the resulting signal strength. This feature improves the auto tuning results in case of very strong or very weak signal cantilever responses.

2. The automatic excitation phase adjustment algorithm now sets the phase at the free vibration frequency to zero. This is done after a new free vibration frequency is found.
3. A ribbon switch icon in the upper right corner of the ribbon was added to toggle between a full and minimized ribbon layout.
4. New calibration file version 5, with support for FlexAFM scan heads that have laser optical power output readout [in mW].

Changes

1. The chart display of the vibration amplitude signal has been changed. The chart's maximal range is now equal to the scan head's maximal amplitude range and not to the controller's maximal input range.
2. Some quality factor parameters in the Cantilever Browser database of known cantilevers types have been updated.
3. The layouts of the Preparation Wizards have been updated.

Corrections

1. Occasional USB communication problems after controller power up or firmware update have been fixed.
2. Occasional software crashes when opening drop-down menus have been fixed.
3. The disappearance of the "Minimize", "Maximize" and "Close" buttons when an NID file was maximized has been fixed.
4. The automatic detection of a connected FlexAFM or NaniteAFM digital camera was improved.
5. Some buttons in the "Acquisition" tab of the ribbon are now correctly disabled while an approach is running.

Software Version 3.0.1

Date: September 2011 (rev. 1)

Changes

1. If the SPM control is started through COM automation, the main window is hidden. Additional scan head features are added to the COM automation interface. See “ScanHead” object documentation for details.
2. Documents view now only minimizes the Windows pane.
3. Display of the Chart histogram has been improved.
4. Approach buttons are grayed out when the system is in a “Wait” state during Imaging, Spectroscopy or Lithography.
5. Pressing “Ctrl+A” in the History tab of the Gallery Panel will allow all documents to be selected.
6. Pressing “Delete” in the Gallery Panel will delete all selected items.

Corrections

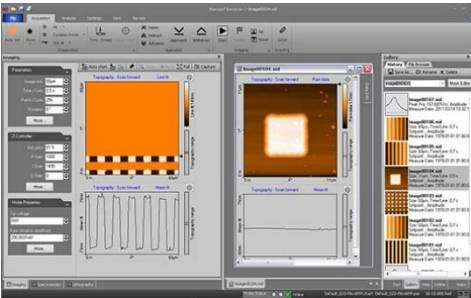
1. All chart properties are now saved correctly.
2. Tool info panel now popup correctly when selecting a tool.
3. The Gallery panel now uses the same color palette as set for the color charts.
4. Issues with controller firmware update occurring on some computers have been resolved.
5. Resizing of the Scan Position and Master Image sections of the Online panel has been improved.

Software Version 3.0.0

Date: May 2011: Initial release

New features

1. A major overhaul of the graphical user interface to conform to current ergonomic standards:



2. A clean layout of standard parameters and access to advanced parameters (via the “More” button) that serves beginners and experts alike
3. An “Auto Set” wizard that sets microscope parameters to suitable values based on sample features, quality requirements and currently selected operating mode
4. A “Gallery” panel that provides quick access to automatically stored measurements
5. An “Online” panel that provides information about the current scan area, tip position and location in a master image
6. A “Help” panel that provides direct access to Manuals, TechNotes, AppNotes and Support
7. Direct editing of chart properties like Signal Source and Data Filter type in chart area titles

8. Video camera streams that can be shown in a single panel or in (larger) separate windows
9. A "Step-by-Step approach" option for AFM scan heads.

Software Version 2.2.4

Date: January 6, 2011 (rev. 0)

New features

1. A spectroscopy measurement can now have up to 65535 data points in total. This number is divided over the number of channels used during measurement (depends on the Operating mode used). Measuring forward and backward spectroscopy still only counts as one channel. For example, if you measure vibration amplitude and phase in forward and backward spectroscopy, the maximum number of points is $65535 / 2 = 32767$.
2. The unit of the deflection signal in Static Force mode can be selected separately for the Chart and the Setpoint. Possible units are m, N and V. The selection is made in the Cantilever Browser dialog.

Changes

1. Support for operation with the FlexAFM CantiClip AO and CantiClip SA has been improved (for further information on the CantiClip, refer to the newsletter to be published end of January 2011).

Software Version 2.2.3

Date: September 20, 2010 (rev. 0)

New features

1. The laser spot in the Scan Head Diagnostics window now graphically displays several conditions of the laser signal:

- No spot: Scan head disconnected.
 - Blinking red spot: Insufficient laser light is reaching the photodetector.
 - Red spot: Laser not correctly aligned on photodetector.
 - Green spot: Laser correctly aligned on photodetector.
2. The Frequency Sweep dialog now shows a phase graph when Phase Contrast is selected as operating mode.

Changes

1. Charts can now be as large as 2048×2048 pixels.
2. A new windows driver for the version 2 Video Module improves overall system stability.
3. Display of the laser working point has been adjusted to more accurately show the usable (green) operating range.
4. When the SPM controller is turned off, or the USB is disconnected, the display of the video signal is stopped to prevent fatal system crashes. You have to exit the software, reconnect or restart the controller, and restart the software to use the video again.
5. The internal speed parameter processing of the AFM approach motor is corrected. As a result, approach is now 8% faster.
6. Detection of tip–sample crash conditions during STM approach has been improved to provide a more robust approach behavior.
7. The Reference Frequency parameter is set to 0 Hz for all static operating modes except force modulation mode.

Corrections

1. The side view video image for the Nanite scan head was flipped horizontally. Movements of the sample are now displayed correctly in the SPM S software.

2. An issue leading to situations in which the AFM approach could not be stopped.
3. The display of a spectroscopy point or line in situations in which the scan image has an offset and/or a rotation is corrected.
4. A problem with the reconfiguration of the controller when a scan head is disconnected and subsequently reconnected.
5. A problem where the video was not controllable through the Controller configuration dialog.
6. A problem in which the loading of .NID files on a computer with a character encoding different from the one on the computer the files were first saved on (e.g. Western European/US versus Asian Windows systems, or systems using other character sets) could sometimes cause software crashes.

Software Version 2.2.2

Date: June 15, 2010 (rev. 0)

Changes

1. The TSC3000 driver now informs the SPM software about position and speed changes.
2. An abort dialog for stage movement (Search Reference and MoveTo) has been added.

Corrections

1. Timeout could cause the system to stop responding when changing from a small (e.g. 1 s) to a large time/line value (e.g. 4 s).
2. Applications stealing focus from the SPM Software could cause pressed buttons (e.g. Advance/Retract) to never be released.

3. Exporting backward spectroscopy data would export forward data and vice-versa.
4. Minor bug fixes.

Software Version 2.2.1

Date: January 14, 2010 (rev. 16)

Changes

1. Layout and Sensitivity changes in the Scan Head Diagnostics dialog.
2. Dark image correction for the FlexAFM Video Camera, which removes pixels standing out from the video image background under high gain conditions.
3. The Auto Clear button has been separated from the regular Clear button.
4. Files with the extensions .HED, .PAR, .CHART, .INI, and .LLD will be read and written in UTF-8 format to support Unicode characters. Files of these types that are in ASCII format will be converted to UTF-8 on the fly. Currently, .NID files will not support Unicode.

Corrections

1. The incorrect offsets were used by the Lithography “manipulation” function.
2. Crashes occurred under VISTA and Windows 7 when closing the application.
3. The frame rate for the FlexAFM Video Camera has been adjusted to eliminate USB bandwidth bottlenecks.
4. Minor bug fixes.

Software Version 2.2.0

Date: July 28, 2009 (rev. 0)

New features

1. Support for the FlexAFM Video Camera has been added.
2. Thumbnail previews of .NID files are now available in the Microsoft Windows Explorer.
3. A Kelvin Probe Force Microscopy controller has been implemented in the SPM software.
4. Sample X- and Y-slope can now be corrected with the click of a button (no scripting interface required) or be set automatically for each measurement.
5. Chart context menu: Several functions (e.g. analysis tools or copy functionality) can now be accessed directly using the chart context menu. It is also possible to copy the currently selected chart to the clipboard.
6. Delete chart data: Old chart data can be deleted at all times, regardless of whether a measurement is running or not. It is also possible to select Auto delete, which deletes the old measurement data every time a full measurement is finished.

Changes

1. Due to the added support for the FlexAFM Video Camera and its functionality, the CompactAFM Video Camera's behavior now follows the FlexAFM Video Camera's behavior.
2. Scrollbars appear if the chart view is bigger than the actual view size.
3. The Video Camera is turned off during STM operation.

4. The “Start” and “Finish” button in the imaging window is now organized as a drop down list button. The drop down list button menu consists of the functions “Start”, “Stop” and “Finish”.
5. The functions “Restart measurement from bottom” and “Restart measurements from top” are also organized as a drop down list button, as are the “Start” and “Stop” buttons in the spectroscopy window and lithography windows.

Corrections

1. Minor bug fixes.

Software Version 2.1.1

Date: March 31, 2009 (rev. 0)

New features

1. Some features that were introduced for the FlexAFM scan head in software version 2.1.0 have been made compatible for non-FlexAFM scan heads.

Corrections

1. Minor bug fixes.

Software Version 2.1.0

Date: March 12, 2009 (rev. 0)

New features

1. Support for the FlexAFM scan head added.
2. “Frequency Peak Search” dialog added.

3. Z-Controller D-Gain enabled for the “Adaptive PI” Z-Feedback algorithm.

Changes

1. The check “Scan head Diagnosis” dialog has been modified to support the FlexAFM scan head. Some of the additional indicators are also available for non-FlexAFM scan heads. The lateral deflection indication is only available for FlexAFM scan heads.

Corrections

1. Minor bug fixes.

Software Version 2.0.0

Date: January 27, 2009 (rev. 0)

New features

1. All Nanosurf control software now contains a dedicated lithography module. With the traditional Nanosurf ease of use, this module can turn your microscope from a surface visualization tool into a surface manipulation tool that can write complex patterns or execute direct freehand tip manipulations.

Features and Benefits of the Lithography module:

- Control software integration:
Easy handling and quick results for beginners
- Direct, mouse-controlled, freehand tip movement:
Scratch patterns, draw oxidation lines, push particles
- Even more possibilities with the licensed Lithography Option:
Use multi-layered vector graphics or multi-level pixel graphics to create complex patterns on your sample surface with just a few mouse clicks

2. The Data Info panel content can be copied to the clipboard and/or saved to a file. The content is organized as “key → value” and separated by a <tab>. This allows easy import to e.g. Excel or Word.
3. It is now possible to close all open “.nid” documents at once.

Changes

1. The scaling of the chart no longer affects the axis text size, unless the display size is smaller than 256 pixels.
2. The Approach panel now uses a progress bar to indicate any approach or retract action.
3. Sensor calibration has been improved. The number of sensor Z-axis movements during calibration or operating mode change has been reduced to a single lift-up event.
4. Adjustment of the free vibration amplitude has become faster and more accurate for very low amplitudes.
5. The Serial Com Port selector “Controller configuration Dialog” now allows selection of any com port number between 1 and 256. Available Com ports may show extra text next to the COMx text e.g. “COM3 USB Serial Port”.
6. The “Frequency Sweep” chart is now displayed in the “Tool Results” panel. As before, the “Frequency Sweep” chart can also be displayed as a measurement by checking “Display sweep chart” in the “Mode Properties” section of the “Operating Mode” panel.
7. Text strings in script files to be used with the Scripting interface should now use a semicolon rather than a comma to separate elements. Example: “1.25,10.25,... → 1.25;10.25;...”.
8. The language selection in the “User Interface” dialog has become a dropdown list.
9. The firmware version is now checked at startup of the PC software. If the firmware version of the controller does not match the firmware

version in the “bin” directory of the software, the firmware will be updated regardless of whether the firmware in the controller is newer or not. This new behavior assures that the PC software and the controller firmware are compatible.

Corrections

1. The flickering of chart views when resizing has been reduced.
2. Minor bug fixes.

Software Version 1.8.0

Date: March 31, 2008 (rev. 0)

New features

1. Support for the SPM S50 and S200 Controllers was added.
2. Charts and documents can now also be exported as TIFF and PNG files.
3. A new and signed USB to Serial converter driver has been integrated into the installation process. The installation is silent, but any device that uses a USB to Serial converter must be disconnected during the installation. The driver will be installed in both the setup and update version of the Nanosurf software installation.
4. This new USB driver and some internal communication reprogramming have been implemented to protect the application from crash at application shutdown and to avoid lost of data on PCs with multiple CPU cores.

Corrections

1. Video window presentation and handling have been improved.
2. The Positioning, Imaging and Spectroscopy window will not be opened when the application is started through a double-click on a NID file.

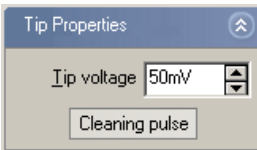
3. Minor bug fixes.

Software Version 1.7.0

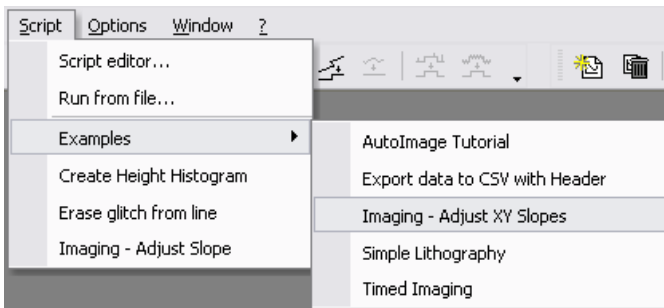
Date: January 8, 2008 (rev. 3)

New features

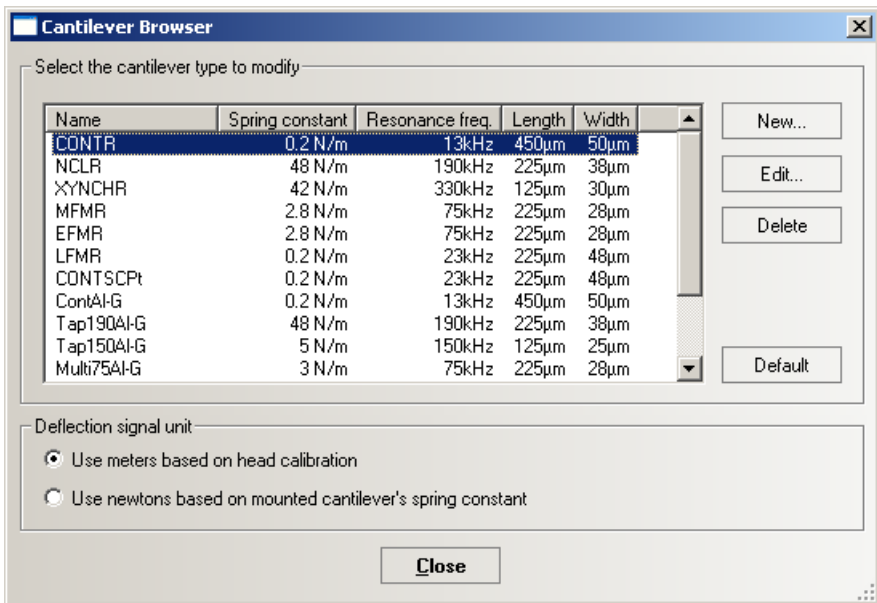
1. Nanosurf Report v5 is now supported.
2. easyScan 2 STM only: A short voltage pulse can be generated by a new button "Tip cleaning" in the "Tip Properties" Panel. The voltage pulse height is 5V and approx. 100ms in duration.



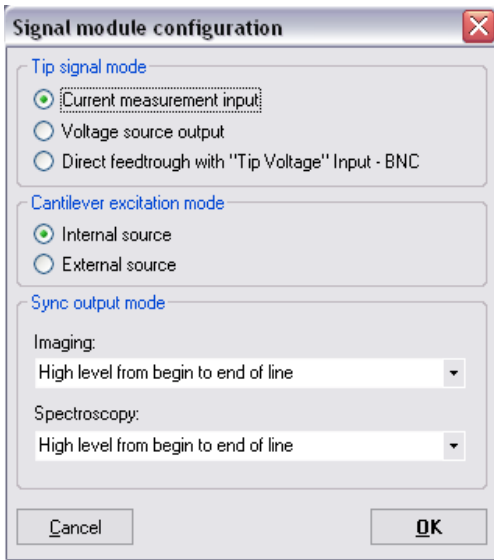
3. The application software is now localized to Japanese, China Traditional and Chinese Simplified languages.
4. User defined Scripts and Report templates are now displayed in their own respective menus, are sorted alphabetically, and can be arranged in subdirectories that are display as submenus.



- An updated Cantilever Browser dialog, which displays more properties of the Cantilevers in a table. Also, new Cantilever types are available and supported by the application: A selected range of available NanoWorld/Nanosensor, BudgetSensors and AppNano Cantilevers are now preconfigured. There are more usable cantilever types with many different tip shapes available from each manufacturer. Please consult their product catalogue for more information.



- Two cantilever deflection unit styles are now available for all static force operating modes: The deflection of the cantilever is either displayed as [m] or [N/m] in all charts. The [N/m] display method is particularly useful for Force/Distance curve measurement with the Spectroscopy Window. Use the selection in the Menu "Options / Config Cantilever types". See the screen shot above.
- easyScan 2 System only: if the Signal Module A is installed in the controller, a new dialog is available at menu "Options / Config Signal Module..." to configure the various output signals:



Changes

1. The Positioning, Imaging and Spectroscopy windows now save their positions and visibility status in the chart-configuration file as well. This provides better customization support for window placement and visual configuration (hidden, shown, or min- or maximized) at startup if the current window placement is saved to the Default chart file.
2. "Color map" and "shade map" charts are now displayed with multiple threads. This improves the drawing performance on systems with multiple CPU cores.
3. easyScan 2 STM only: The manual approach speed can be configured by a new value in the scan head calibration file:
"MaxApproachSpeed=1.0".
4. Integer values in the Windows Registry are now saved as Integer-Keys and not as Strings-Keys as they were before. Old String-Keys are still readable.

5. Scripts have to be saved as UTF-8 formatted files to support international characters and not as ANSI or simple text.

Corrections

1. The "3D View"-chart could crash if the number of lines and points where not equal. This bug has been fixed.
2. If Windows was configured to hide file extensions, the deletion of saved crash files was not possible. This has now been corrected.
3. If Windows was configured to use a character other than ‘.’ as decimal point, the script function objData.SetLine() could not convert the data string. To solve this error, any script using SetLine() should first join data by using the command Join(dataarray,";"). Do not use Join(dataarray,",").
4. Slow scanning of images with 2000 pixels or more could crash the firmware in the controller. This problem has been solved.
5. Various User Interface menu and Toolbar bugs have been corrected to avoid some rare cases where crashes occurred when the mouse hovered over a menu or tool bar item.

Software Version 1.6.0

Date: May 3, 2007 (rev. 0)

New features

1. The application software is now compatible with Microsoft Windows Vista.
2. The application software is now compatible with international character sets.
3. easyScan 2 System only: Driver support for new easyScan 2 AFM Video Module.

4. New Scripting Interface commands. Read more details on page "Version history" of the Script Programmers Manual.

Changes

1. Improved automatic detection of different video module driver.


Corrections

1. At start up or upon loading of parameter/chart files an empty error dialog could be displayed. This bug has been corrected.
2. The approach was started even if the frequency sweep displayed an error. This bug has been corrected.
3. Print Preview could crash if resized corrected.
4. Maximum number of data points could be too high in some operating mode.
5. Save and restore functionality of Workspaces improved.
6. Improved Controller communication to handle special rare cases.

Software Version 1.5.1

Date: November 24, 2006 (rev. 1)

New features

1. New tool  "Correct background plane" added to the Tool menu. With this function it is possible to remove the slope in X and Y direction of an image. The plane is defined graphically by three points in a color map chart. These three points should mark positions of equal height. The software then calculates the plane which contains all three points and subtracts this plane from the image data. Thus it sets the height of the three points to an equal height.

2. The tools "Create cross section" and "Calc line roughness" are now active in Line charts too.

Changes

1. The change in behavior of the tool "Correct Scan Line Levels" in v1.5.0 is changed back except for the creation of a full copy of the document. Together with the background plane correction tool this behavior is more useful.
2. Maximum "Time/line" value in the imaging panel is increased from 10s to 120s.

Corrections

1. The dialog shown without any text content is no longer displayed if some special Chart- or Parameter files are loaded.
2. The creation of a new chart in an empty window or document no longer crashes the software.
3. Write access to a write protected file is now displayed as an error.
4. Approach stage motor movement during system initialization is now suppressed and does not result in an endless movement.
5. Improved video camera driver detection. The parameter setting for the two known drivers is automatically set. For unknown drivers the user can adjust the parameters with the configuration buttons in the "Config. Controller" dialog.
6. The predefined position of the tip at approach now correctly loads from hed-files at start up or after change of calibration file.
7. A wrong message "Approach at max limit" appeared in the approach panel at start up. This bug has now been fixed.
8. The P- and I-Gain settings of the Z-Controller were limited to wrong maximum values on some older calibration files. This bug has been fixed.

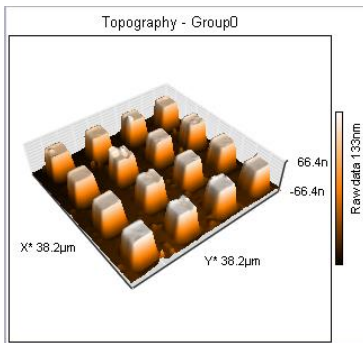
9. easyScan 2 System only: During STM approach the movement could suddenly speed up and never reach the target. This error has been corrected.

Software Version 1.5.0

Date: August 15, 2006

New features

1. The 3D view chart has been replaced with an interactive OpenGL version with much better image quality.



To interactively control the view of the surface, click and hold the left mouse button down over the 3D image area:


- To change the rotation angle, move the mouse left/right,
- To change the tilt angle, move the mouse up/down.

To change different properties, additional keys or mouse buttons have to be pressed:

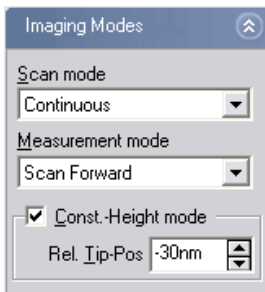
- To change the distance to the surface (to zoom out/in), hold down the Ctrl key while moving the mouse up/down.
- To change the surface position, hold down the Shift key while moving the mouse up/down or left/right.
- To change the z-range scale, hold down the right mouse button while moving the mouse up/down.

- To change the light source angles, hold down both Shift and Ctrl keys. Moving the mouse left/right changes the light source azimuth from 0 – 360°. Moving the mouse up/down changes the light source altitude between 0 – 90°. The light source is shining from far away to the centre of the surface. An altitude of 0° means the light source is in the surface plane. An altitude of 90° means the light source is exactly above the center of the surface.

During the interaction the surface is reduced in feature complexity to improve drawing speed. The final redrawing time after releasing the left mouse with full surface precision could be slow on older PCs. With the Chart Properties "Span" and "Center" you can define the thresholds for high and low features.

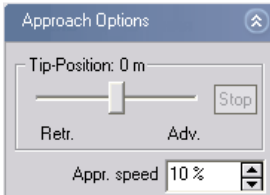
Hint: To create good-looking 3D images use the Tool "Correct Scan Line Level" and then the new Glitch and Noise reduction filters to remove unwanted measurement artifacts. Set the light source azimuth to 90° (parallel to the scan lines) to remove unwanted shadows between individual scan lines. Click the  tool bar button once or twice until no clipping of high features is visible (or adjust the "Span" and "Center" Properties).

2. A new Imaging Mode for MFM/EFM measurements is implemented in the Advanced level User Interface:



A full description of the theory and operational usage can be found in technical note TN00031 MFM, which registered users can download from the support area of our home page.

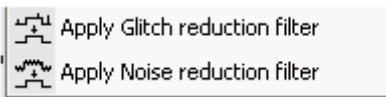
3. A new Approach Option to control the stage position is implemented in the Advanced level User Interface:



The slider defines the position of the tip during the approach. Normal position is in the center at $0\mu\text{m}$. For surfaces with deep or high features close to the maximal z-scan range it could be better to set the tip position close to one side of the z-range. For surfaces with holes set the tip position closer to "Retracted". For surfaces with high small features set the tip position closer to "Advanced".

After the approach you can also readjust the tip position with this slider (e.g. drift movement compensation). To do this click and drag the slider to the desired position and release it. Then the approach motor starts to move the scanner stage and the z-feedback controller tracks the tip position until it reaches the new position. The "Approach speed" parameter controls the stage moving speed. Use speeds as slow as possible to minimize the risk of tip damage. If the movement takes too long click the "Stop" button to interrupt the movement.

4. Two new Tools to reduce image distortions are implemented (Tools Menu):



They reduce typical imaging problems: The "Glitch" filter removes single scan line distortions. The "Noise" filter removes overall pixel noise. To apply a filter to a signal click to the corresponding Color map chart and select the menu item or tool bar button. A copy of the full

document is created with the selected signal filtered; all other signals remain unchanged.

Hint: These filters are very useful for creating good-looking 3D images because even small glitches and noise disturbances are very visible in the 3D rendering because of the lighting.

5. The sliders in the Video Options Section of the Video Panel are now interactive during the sliding, and the video updates image immediately. The illumination only changes immediately if the scanner is not scanning.
6. A new automatic hardware signal offset calibration prior to the approach enables better low amplitude measurements in Dynamic Force and Phase Contrast Operating Modes.

Changes

1. Printing and Windows BMP-Export has been improved. A poorly sized document window size no longer clips the charts. Also the background is now white.
2. A change of scan speed ("Time / Line") no longer forces a restart of the current image.
3. The tool "Correct Scan Line Levels" now creates a full copy of the document like the Glitch and Noise reduction filters. The results no longer depend on the selected chart filter. Instead, the tool always uses the raw data, and alters the height values of the selected line to the mean height value of all raw data points between the start and end point of the selected line. These changes help to get good-looking results more quickly.

Corrections

1. A 0% illumination setting now completely switches off the lateral LED illumination.

2. Scripting Interface properties IsMoving, IsCapturing and IsMeasuring no longer block the script execution.
3. Scripting Interface method StartMoveTipTo(x,y,z) and Spectroscopy Panel Position Section parameters now calculate the correct tip positions

Software Version 1.4.0

Date: March 2, 2006 (revised March 16, 2006)

New features

1. Mobile S System only: Support for Mobile S Rev 2 Controller and Scan Heads.
2. Enhanced "Spectroscopy Window" functionality:
 - Modulation Output calculates modulation ramp with higher resolution. No more value rounding problems.
 - Modulation of "User Output"-DAC is possible now. Available with Mobile S Rev 2 Controller and easyScan 2 Systems.
 - Activation of Z-Controller and measuring of the "Topography"-Signal is now possible. Available for all Operating Modes.
 - The "Start" button changes to "Stop" during measurement. Therefore a spectroscopy sequence can now be stopped by the user at any time.
 - Range checking can now be switched off if desired. This simplifies the handling for standard spectroscopy situations where no precautions are necessary.
 - The Averaging function now only includes completed measurements and ignores spectroscopy data from aborted measurements (range check events or user stop request).
 - If range check events occur, an information dialog appears and the total amount of events is stored to the document and is visible in the Data Info Panel.
 - Small improvements in the User Interfaces for Easy, Standard and Expert Levels.

3. Series of images can now be captured automatically with the improved "Photo" button in the Imaging Window. A click to "Photo" activates the capturing mode until the "Photo" button is de-selected again or the scanning is stopped. In capturing mode a new document is created every time a complete frame is measured.
4. New User Input/Output Section in the "Operating Mode" Panel. Available with Mobile S Rev 2 Controller and easyScan 2 Systems.
5. Individual Sync-Output mode settings for Imaging and Spectroscopy. Refer to "Programmers Manual."
6. New Script Interface Properties and Methods:
 - Support for the new spectroscopy features
 - Enhanced window and dialog visibility control
 - Individual Sync-Output mode settings for Imaging and Spectroscopy.
 - Some new properties for Scan- and Approach-Class
7. Refer to "Version history" page in the "Programmers Manual" online help for a full documentation of the new functions.

Changes

1. File load and save dialogs remember the most recently selected directory and reuse it the following time
2. The scan head calibration dialog has an improved User Interface for better usage.

Corrections

1. Bug in the „Measure distance " tool corrected. Distance measurement of "Cross Section"-Results was not possible.
2. Under certain circumstances the approach with AFM scan heads could end at maximum range instead of close to z-midrange. This is now corrected.

3. Software compatibility check and automatic firmware update functions are improved.
4. Color palette settings are now saved and restored at start up.
5. The "Positioning Window" now stores its window size in the chart file.

Software Version 1.3.0

Date: August 23, 2005 (rev. 2)

New features

1. Opening *.ezd measurement files created with easyScan E-Line or easyScan DFM software is now supported. Use the standard Menu "File->Open..." Dialog and select File type "easyScan Data file". Drag and drop of *.ezd-files onto the Application Window is also supported.
2. The Scripting Interface is improved with new objects. Full document handling is now supported for script languages, as is creation and manipulation of data document windows, chart displays and data containers. A complete description of the new objects is found in the updated "Programmers Manual" online help file. The updated MobileS.tlb-File defines the added interfaces.
3. New script examples added. "Remove glitch" demonstrates data manipulation, "Create Histogram" demonstrates data analysis possibilities and "Adjust Slope" demonstrates how to create online helper functions. A demo script to export data values to a customer defined file format is also included.
4. A LabView example program is available on request for free. It demonstrates how to control the measurement application with the LabView VI graphical program.
5. The tool "Measure Length" now always calculates both "Width" and "Height" of a distance.

Changes

1. The "Save Image" button is moved from the video window into the "Video Source" Section.
2. If the application reloads files which were not stored it displays an information dialog after startup.
3. User level "Standard" and "Easy" automatically switch on the "Auto" check boxes for all the hidden functionalities. They also set default numerical values to some hidden properties.
4. Force Modulation Operating mode now always displays the resonance peak search chart.

Corrections

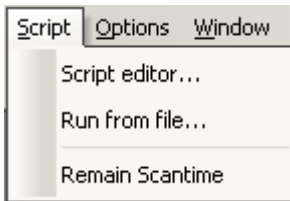
1. Tip Voltage adjustment was not possible in "Advanced" user level. This has been corrected.
2. Manipulating scan head calibration information with the Scan head Calibration Dialog no longer allows changing the wrong signal.
3. "Measure Distance" and "Measure Angle" tools now only require identical units of X and Z axes if a chart is in line mode to measure the distance or angle.
4. Firmware update is only performed if controller is compatible with PC software.
5. Menu "Config->Check Scan head" now displays real information.
6. Under rare circumstances it was possible that unexpected approach motor movement or change of video camera source could happen. This has been corrected.

Software Version 1.2.0

Date: Januari 10, 2005 (revised June 30, 2005)

New features

1. Visual Basic Scripting technology is integrated into the software. The application has a built in interpreter for VBScript. Automated measurement, lithography, custom data analysis functions and many more are now possible. A rich set of commands give the user full access to software internals and microscope settings.



A new pull down menu "Script" has been introduced. A "Script Editor"-Dialog can be opened to enter VBScript programs interactively and can be executed by a click to the "Run" button.

Completed programs can be loaded and run by either selecting a script by file dialog or just selecting a script as a menu item. Scripts in a configurable directory are displayed in this menu.

A "Script Programmers Manual" is included with the software. It has a Tutorial chapter for beginners, sample programs and a full object interface reference for advanced users. (see 5. for more details)

2. Controlling the application from external programs is now supported. The application acts as a standard COM Automation Server. This is a Microsoft Standard for interfacing different software application. Many third party programs are compatible with this standard such as LabView, MathLab, Visual C++, Visual Basic, Java or Delphi.

The external program can control the SPM software with the same commands as the internal script interpreter does. The "Script Programmers Manual" has a chapter on how to integrate the SPM Software application into other third party software.

3. A protection for unsaved measured data has been implemented. If the software crashes, the unsaved images can be recovered from the temporary disc space. The next start of the application restores and loads these images automatically from the temporary disc space
4. Operating and Reference Manuals have been updated
5. The new "Script Programmers Manual" takes the form of a windows help file. It can be found at "Start->Programs->"Your SPM Software"->Script Programmers Manual".

Changes

1. The description of values in the Data Info Panel is now equal to the user interface names.
2. If Auto start imaging is enabled in the Position Window, the Imaging Window is now automatically opened and brought to the front.
3. The file name extensions of report templates have been removed from the Menu Report.

Corrections

1. Chart Properties Dialog: New values entered in Span and Center are now properly range checked.
2. Saving documents while exiting the program with open Position or Imaging windows could generate corrupt data files. This has been corrected
3. Software no longer crashes if "Photo" and "Retract" buttons are clicked to quickly after another.

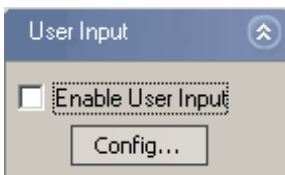
4. Scanning very slowly no longer leads to "No connection to microscope" error messages.
5. On older or slow PCs the data transfer from Mobile S Controller could be blocked while scanning of large images. This has been corrected.
6. Menu "Report->Add measurement" now works with unsaved images.
7. A image size of only one scan line was handled incorrectly. This is now possible and the Image height is set to 0.
8. Loading of par-files with different operating modes could set the z feedback controller set point to a wrong value. This has been corrected.
9. Closing of the application while redrawing a chart no longer crashes the application.
10. The start of an approach for recalibration during scanning could crash the tip into the sample in special circumstances. This has been corrected.
11. Tool Roughness Area: The unit for Area size is now displayed correctly.
12. Tool Roughness Line: The unit for Length is now displayed correctly.

Software Version 1.1.0

Date: September 21, 2004

New features

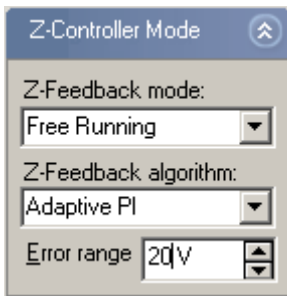
1. A 'User Input' is now active. A new section "User input" is now in the Operating Mode Panel:



The User Input is available in all imaging and spectroscopy modes except in the "Spreading resistance"-Operating mode. If you click on "Config" you can freely define a name for the user input, define the physical unit of the signal and its range.

This information is stored in the currently loaded scan head calibration file. If a user has no Windows XP/2000 access rights to the hed-file this cannot be saved. In this case create a copy of the calibration file and load this copy, then the user input information is stored there.

2. A highly improved Z- Controller due to a new real time algorithm in the Controller software. This new algorithm reduces noise and spikes in the topography and the phase signal. Therefore a new section has been introduced in the advanced user level. In all other user levels this new algorithm is automatically active.



3. The I-Gain (Standard and Advanced Level) and Loop-Gain (Easy Level) are now self adapting to the sensitivity of the scan head. This simplifies the usage of high resolution and large scan heads. The user no longer has to remember different gain settings for different scan heads. In all cases an I-Gain / Loop-Gain of about 1000-2000 is ok to measure, as for the large scan head.
4. The chart properties dialog now auto updates its chart immediately after the values have been changed, without closing the dialog window. It also contains a "Set" button. Use this to optimize the z-range manually.

5. The video images of both video cameras can now be stored as a JPG-file. The save button is just below the video image in the position window.
6. In each document the following information it is now saved: Controller's serial number, its firmware version and the PC SPM Software version.
7. Operating and Reference Manuals are now available

Changes

1. The arrangement algorithm of charts has changed. It first tries to align new charts vertically instead of horizontally. But if there is more space to the right than to the bottom it places a chart in the next row. This behavior should ease chart handling.
2. Behavior of automatic z range adjustment for line charts optimized. A histogram algorithm and new minimal thresholds are now used.
3. The red coloring of out of range data is now only done if data values are out of measurement range and not only out of visible chart range.
4. In "Spreading resistance"-Operating mode, the tip voltage section is now displayed in all user levels.
5. Spectroscopy Panel now has slightly modified section layouts in all user levels.

Corrections

1. Selection of report files, displayed in the Report pull down menu, now working correctly.
2. Numerical format of data export to csv-Files und plt-Files corrected.
3. The positioning of new document windows has been improved.
4. Error in the calculation of X/Y Position for cursor tools if a chart has an offset other than zero has been corrected.

5. Error in Chart Properties dialog corrected: Handling of "Show axis"- and "Auto set"-button of data range was only updated if another button was also changed.
6. COM-Ports above COM9 could not be selected. The new limit is now COM99.

Software Version 1.0.0

Date: Juli, 2004: Initial release