SmartSoft-AES Software Release Notes

Release 6.5.0 – June 2025 (Win10/11; 64-Bit)

OVERVIEW
   EGun Tuning, Bug Fixing
NEW FEATURES
   <u>SEM</u>
   1.   Added EGun Tuning for issue following opening of the isolation valve

   <u>Hardware</u>
   2.   Drive without stage protection when driving during Ion Gun tuning

BUG FIXES
   <u>UI</u>
   1.   Cleaned up check box control interaction

   <u>Sample</u>
   2.   Fixed an issue that invalidated stage settings in 6.4.0

Release 6.4.0 – May 2025 (Win10/11; 64-Bit)

OVERVIEW
   97mm Platen Option, Bug Fixing, Minor New Features
NEW FEATURES
   <u>UI</u>
   3.   Added Comment to Ribbon Menu under Data Manager
   4.   Improved outgas preview and outgas preview button hint
   5.   Added support to make sure that popup views are within the screen height
   6.   Replace some list components with an updated component
   7.   Improved feedback when saving a setting
   8.   Improve logging for Data Sampling
   9.   Main Menu>Help>Contact Us...: Add contact information for PHI USA and Ulvac-Phi. SmartSoft-AES\Contact.txt can be edited to include system or region specific information
   10. Add auto show pinnable side toolbar menus

   <u>Configuration</u>
   11. Add 97mm Stage option

   <u>Sample</u>
   12. Improved acquisition simulation data
   13. Use file explorer to open folders
   14. Add 97mm platen type
   15. Limit tilt range when 97mm platen is on the stage
   16. Limit Zalar radius to a max of 4mm with 97mm stage option

   <u>SEM</u>
   17. Support both full screen and tile layout in SEM tab
   18. Add 781B diagnostics

19. Add service queue task to set the EGun Beam state

Hardware
20. Updated the Analyzer/Detector schematic
21. Changed the bake to run through the queue and auto start the chart recorder

BUG FIXES
UI
3. Moved history settings section to be above favorites
4. Add sputter setting name to sputter queue task summaries
5. Fixed chart recorder setup tab not displaying correctly
6. Drive to position by name queue task will now reference queue position lists if they exist
7. Allow all user levels to overwrite DEFAULT and PREVIOUS settings
8. Fix issue with some queue settings not being imported from the UI correctly
9. Fix issue with some views not being initialized correctly

Sample
10. Fix issue causing Stage settings with rotation center correction to not save the correct values

SEM
11. Added hints to FE reset and Z align buttons

AES
12. Fixed an issue where the acquisition status popup window was not showing
13. Fixed issue with missing file header information
14. Improved saving raw data file

Hardware
15. Save the chart recorder to csv after Ion Gun outgassing
16. Changed default Ion Gun neutralize setting from NEUTRALIZE_NEUT to NEUTRALIZE
17. Changed default Ion Gun baud rate from 115200 to 9600
18. Fixed an Ion Gun ramp log message units
19. Improve turbo simulation
20. Fixed issues with Ion Gun tuning settings looping
21. Fixed an issue where the queue would hang if Ion Gun tuning validation failed
22. Allow for easier aborting of Ion Gun tuning by clicking the tune button while tuning running
23. Fixed an issue causing bake failures due to CPU slowness

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Release 6.3.0 – January 2025 (Win10/11; 64-Bit)

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OVERVIEW
Bug Fixing, Minor New Features
NEW FEATURES
UI
1. Added right click menu to pin tabs to pin or unpin all tabs.
2. Improved Queue Editor UI for easier navigation.
3. Main Menu Bar>Tools>Resource Monitor...: Default to the max for Memory, Handle, and Thread monitors.
4. Added Zoom to Task button to expand the current job and highlight the current task in the Queue Editor.
5. Added Select all/Unselect all right click option to the Queue Editor for updating job and task active states.

Sample
6. Changed functionality for Intro Photo Zoom mode. Zoom to current cursor position rather than last clicked position.

AES
7. Improved acquisition status feedback.

Hardware
8. Added the ability to change the baud rate for multiple devices.
9. Added default neutralize setting for Ion Gun.
10. Updated the Analyzer/Detector schematic.
11. Added an option to disable pressure interlock monitoring during a bake.
12. Added a 10 second delay to power loss recovery task after turning on the rough pump and before opening V7.

BUG FIXES
Installation
1. Fixed an issue with missing VC++ runtime files. No longer need to run the VC++ redistributable.
2. Removed .NET prerequisite from the Die Navigation Option Installer.

UI
3. Cleaned up Queue Editor tasks list.
4. Main Menu Bar>File>Save System Parameters: Fixed Auto Save parameters reverting to Never Save.
5. Fixed a bug causing Invalid Window Handle error on shutdown.
6. Fixed an issue where SmartSoft shows up off screen on startup.
7. Fixed a bug where the currently selected item in a list sometimes had the incorrect font color.

Sample
8. Changed the wording of the auto pinning procedure to be more specific.
9. Fixed an issue with zooming out on SPS image not displaying the reference image.

SEM
10. Cleaned up SEM hardware initialization error messages.

AES
11. Fixed continuous sputter combo box flickering.
12. Removed warning for high number of cycles when starting a profile acquisition.
13. Fixed a bug with long profile acquisitions aborting by limiting the number of curves visible in the Spectral Viewer at one time.
14. Fixed a bug causing the acquisition status popup menu to not show.

Hardware
15. Fixed a compatibility issue with the PBR cold cathode.
16. Reset Outgas Supply if outgas procedure is aborted.
17. Fixed issue with corrupted Ion gun settings files.
18. Only ramp Ion Gun emission when filament is cold and coming from Off mode.
19. Set theoretical work function values to read only.
20. Cleaned up Ion Gun gas warning when starting a profile in the Queue.
21. Remove "_NEUT" from Ion Gun settings.
22. Fixed Ion Gun Diagnostics not reading.

KNOWN ISSUES AND LIMITATIONS
1. When hovering over the SmartSoft-AES Icon in the Windows Toolbar, the preview may not be accurate.
2. Issues closing incomplete Map files.
3. SEM tries to restart after acquisition run in queue. This can cause issues when running multiple acquisitions back-to-back in a queue. To resolve this, turn off SEM before starting the queue.

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Release 6.2.1 – May 2024 (Win10; 64-Bit)

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OVERVIEW
Die Navigation, Work Function & Channel Offset Calculations, UI/UX Improvements, Bug Fixing
NEW FEATURES
Installation
1. Die Navigation activation key required for the configuration option.
2. Removed the Enhanced IR option key.

Configuration
3. New configuration option for Die Navigation. Requires the activation key to be installed to turn on.
4. Remove Enhanced IR option, capabilities will be available for all customers without installing the key.

UI
5. Main Menu>View >Reset Layout: Return main view menus to their original sizes.
6. Can now maximize sizable windows.
7. Main Menu>Tools>Analyzer and Detector: Added calculations for Work Function and Channel Offsets.

Sample
8. Added Die Navigation functionality to align pins to die corners.
9. Added additional alignment pin sets and save alignment set with platen.

AES
10. Added copy button for Map acquisition images including spatial area definitions.
11. Added Load SEM task to the Queue Editor.
12. Added optional load SEM Setting to AES Acquisitions.
13. Added Z height to Mosaic Acquisitions.

BUG FIXES
Installation
1. Fixed issue where ConfigurationSetup.Exe would not be run from CustomActions.exe.

UI
2. Add reserved queue settings.
3. Fixed an issue that would cause application log messages to not appear.
4. Improved application log backups.
5. SmartSoft will no longer take focus away from currently selected UI control when mousing over the Intro Photo Wafer Map or SEM image.
6. Mouse wheeling up/down to change a value will now be applied to whichever UI control the mouse is hovering over, rather than the currently selected control.
7. Improve Z ordering of windows to fix issues caused by hidden prompt dialogs locking up the UI.
8. Main Menu>Tools>Analyzer and Detector> Support 20-378A diagnostics.

System
9. Fixed an issue with missing context menu for Park Platen glyph.

10. Add reserved section to Stage Settings selection.
11. Stop sample handing procedures before stopping stage movements when using header bar stop.
12. Fixed an issue where platen settings would be lost on restart.
13. Removed +15V stage diagnostic.

SEM
14. Improved auto video errors.

AES
15. Fixed an issue failing to read Map files for a More Acquisition.
16. Improved saving of intermediate data files.
17. Fixed an issue when removing regions from Profile More Acquisitions.
18. Removed inaccurate acquisition time estimates.
19. Allow header bar stop button to abort acquisitions.
20. Added Application log for Mosaic Acquisitions.
21. Fixed an issue where the spectral data plot would not appear when starting a Profile Acquisition.

Hardware
22. When tuning Ion Gun reserved settings, skip Initial, Zero, Default and Previous settings.

CommChecker
23. Made general improvements to operation of CommChecker.

KNOWN ISSUES AND LIMITATIONS
4. When hovering over the SmartSoft-AES Icon in the Windows Toolbar, the preview may not be accurate.
5. SmartSoft-AES shows invalid window handle error on shutdown.
6. Issues closing incomplete Map files.

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Release 6.2.0 – November 2023 (Win10; 64-Bit)

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OVERVIEW
Queue Editor, Header Bar, Ribbon Menu, UI/UX Consistency and Improvements, Automated Ion Gun Outgas and Tuning, Windows 11 Support, Bug Fixing
NEW FEATURES
Installation
1. A batch file to do weekly settings backup is installed and added to the Windows Task Scheduler to be run every Sunday at 3AM. The backup schedule can be modified by using Task Scheduler. The backup settings are compressed and saved in C:\SmartSoft-AES\SettingsBackup.
2. Add error message on CustomActions.exe failure.

Configuration
3. Add support for GigE intro photo cameras.
4. Add support for Imaging Source Intro cameras.
5. Add USB connection monitoring.
6. Add support for 15-680 Hot/Cold stage.
7. Add Mosaic Map option for AES SmartMosaic to Configuration Properties.
8. Add simulation support to System Configuration.
9. Add support for 20-068 Ion Gun Control.

10. Login: Administrator password has been reset. Please contact CS for the new default password.
11. Main Menu Bar>View>Header Bar: Display current platen name, task/donut status, platen presence status/platen.
12. Main Menu Bar>View>Header Bar>Stop Button: Many of the individual stop buttons in the UI have been removed. Pressing the same start button may stop the specific procedure, however this is not always the case. The universal stop button will stop almost any procedure being run.
13. Main Menu Bar>Header Bar>System Status Indicator: This is the symbol in the far right of the header bar. It is used as an indicator for any system errors. When there is any error, the symbol will turn red with a triangular shape. Click on it to review errors/warnings in Application Log.
14. Resizable Viewer Display: In the output area, provide tab pin to choose which viewer to display and vertical splitter to resize the width of each viewer.
15. Main Menu Bar>View>Ribbon Menu: Add ribbon menu UI option for quick access to commonly used functionality and information.
16. Main Menu Bar>Automation: Replace Autotool functionality with the Queue Editor and added quick access menu items for STARTUP and SHUTDOWN Queues. Please refer to the Queue Editor User Guide for more information.
17. Main Menu Bar>Tools: Added SEE Database Apps.
18. Improved window management: Add minimize button for most popup windows.

System
19. System Bird's Eye: Always show park platen station if configured.

Sample
20. Position List>Point Generation: Add point generation for easier creation of many points.

SEM
21. Allow mouse wheel to resize the IR box size and spacing.
22. Add warning message when setting Beam Voltage >20 kV from lower voltages.

AES
23. Add "Add to Queue" buttons for all acquisition types. This includes queue customization that can be found in the "AES Setup…". This custom setup is applied when using the "Add to Queue" button. Please refer to the Queue Editor User Guide for more information.
24. Add "Auto-Close Last Acquisition File" option to spectral display viewer.
25. Mosaic: Added AES Map and SEM SmartMosaic acquisition mode.
26. Ion Gun parameters in data file are always pre-sputter parameters and a neutralize set of Ion Gun parameters are added.

Hardware
27. Main Menu Bar>Tools>Outgas Conditioning: add automated outgas for the Ion Gun.
28. Ion Gun: 20-068 Support
29. Ion Gun: Add automated tuning for sputter settings. This requires a faraday cup platen to be loaded and the FARADAY CUP & FARADAY CUP ADJ stage settings to be set up properly. Tuning will be run on the currently loaded setting. Or tuning can be set up from the queue editor tool palette to loop through all settings, all reserved settings, or all favorited settings.

Simulator
30. Use new common simulator.
31. Add ability to persist parameter values in the SmartSoft Simulator.

BUG FIXES

32. Removed running CustomActions.exe on SmartSoft startup.
33. Turn SEE option on by default.
34. Fix issue with CustomActions.exe failing to register WinUSB drivers.

UI
35. Consolidate startup error messages.
36. Main Menu Bar>Tools>Chart Recorder: Refresh the chart recorder every hour to reduce memory usage.
37. Main Menu Bar>Tools>Chart Recorder: Remove unconfigured parameters from the drop-down menu.
38. Main Menu Bar>Tools>Chart Recorder: Show pressure values in scientific notation.
39. Fix issue closing popup menus using the 'X' title bar button.
40. Tooltip/hint display duration now based on length of the tooltip.

System
41. Valve Bird's Eye: Fix issue with vacuum tasks not updating rough pump state.
42. Sample Transfer: Ensure driving stage using absolute positioning during park/unpark.
43. System Bird's Eye: Improve platen drag/drop functionality for Intro/Extract and Park/Unpark.
44. System Bird's Eye: Change gun state indicator colors. White = Off, Yellow = Standby/Blank/Ready, Green = On.
45. Vacuum: Turn off 777B Pressure Control when V8 is closed.
46. Fix issue with HERO bias box initializing itself in an unknown state.

Sample
47. Stage: Fix issue where stage rotation would stop rotation at 180 degrees.

SEM
48. Restart SEM after Photo with preview.

AES
49. Depth Profile: Fix issue with sputter failing by timeout after Alt Sputter Position Depth Profile.
50. Depth Profile: Fix issue with crashing when opening Depth Profile file in MultiPak.
51. Element Database Editor: Fix issue when adding Xe transitions changing name to CustomXeX.

Hardware
52. Ion Gun: Correct the problem with emission being set to target value before ramping emission.
53. Ion Gun Diagnostics: Fix for Filament Current units, should be (A) instead of (uA).
54. Ion Gun/E-Gun: Fix issues with filament usage displays.

KNOWN ISSUES AND LIMITATIONS
55. When hovering over the SmartSoft-AES Icon in the Windows Toolbar, the preview may not be accurate.
56. Issues with GigE camera failing to take intro photo.
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Release 5.7.1 – August, 2019 (Win7; 32-Bit)
Release 6.1.1 – August, 2019 (Win10; 64-Bit)
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OVERVIEW
R-Limit switch support for 15-680 Hot/Cold stage, Enable/Disable Motors, I-Neut header

NEW FEATURES
UI

1. Menu Bar>Hardware>System Configuration: Add R-limit switch support for 15-680 H/C stage. Note that H/C stage is controlled by supplementary software package (external to SmartSoft).

Sample
2. Sample>Stage>Properties: Add 'Enable All' and 'Disable All' motors buttons.

Hardware
3. Ion Gun: Support Ion Neut parameters separate from Presputter parameters in data file header.

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Release 5.7.0 – October, 2018 (Win7; 32-Bit)
Release 6.1.0 – October, 2018 (Win10; 64-Bit)

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OVERVIEW
   SEE diagnostics; Minor feature enhancements; Bug fixing

NEW FEATURES
   SEE
   1. The System Evaluation Environment (SEE) is a new service utility built into the SmartSoft software which periodically records all system parameters while SmartSoft is running. Notes: By default this utility is not activated; and Proprietary analytical data is never collected with SEE.
   2. Menu Bar>Hardware>System Configuration>System...>SEE: SEE data collection can be fully activated or deactivated in the configuration menu.
   3. Menu Bar>Hardware>System Log Setup...>Data Sampling: SEE data collection can be partially activated or deactivated for individual hardware devices by selecting Data Sampling. Note that Data Sampling for individual devices is only valid when SEE data collection is activated in the System Configuration.

   UI
   4. Menu Bar>Hardware>System Configuration: Simplified UI: configuration options are organized by sessions; property dialogs are added for detailed configuration options.
   5. Menu Bar>Hardware>System Configuration: Add support for the Gamma MPCq pump controller.
   6. Menu Bar>Hardware>Chart Recorder...: The Chart Recorder now includes an 'Auto Scale' feature which optimizes the data displays for all plots.
   7. Menu Bar>Hardware>Resource Monitor...: Add monitoring of C: hard disk space. A warning message is displayed when the available disk space falls below an enterable threshold value.
   8. Menu Bar>System>Task Scheduler...: A 'Once' checkbox option is added to the task scheduler to limit the processing of the task to run only one time.

   System
   9. Menu Bar>Hardware>System Configuration>Ion Pump Control: SmartSoft-AES adds supports for the Gamma MPCq pump controller.

   Sample
   10. None

   SEM
   11. SEM>SEM Properties>Image: An improved image processing routine is available for enhancing live SED images.

12. AES>Data Manager>Lab Book: The lab book can now include an unlimited number for data file entries. Previous limit was 150.
13. AES>SEM Viewer>Image Registration: The saved reference image is now displayed as part of the image registration setup dialog.
14. AES>SEM Viewer>Image Registrations>Properties: One can now pre-select the acquisition behavior when an image registration fails (Prompt User, Continue, Stop). Prompt User - will display a dialog box and wait for operator intervention; Continue - will continue the data acquisition without image registration; Stop - will stop the acquisition at the current frame or cycle.
15. AES>SEM Viewer>Image Registrations>Properties: One can now select the number of retries before reporting and IR failure.

Hardware
16. None

Service
17. CommChecker.exe: A new utility called CommChecker is included in the SmartSoft-AES\bin folder. CommChecker is used to check the communication channels as defined in the SmartSoft-AES configuration properties file for trouble shooting purpose.

BUG FIXES

18. UI>Tab Stop: Tab stops are removed for all menus.
19. UI>Menu Bar>System>Task Scheduler...: Fixed problem where the Task Scheduler incorrectly reports "AutoTool is already running".
20. System>Intro Photo>Take Intro Photo: Corrected the problem where taking intro photo is very slow and SmartSoft becomes unresponsive.
21. Sample>Position List>Z Position = 0.0: A default Z position of 0.0 indicates that the Z position is unknown at the time the position is created (e.g. platen not on the stage; import from defect file). *Drive to Position* ignores the Z move when the Z position is 0.0. SmartSoft now displays a prompt which clarifies that a default value of 0.0 maintains the current Z position; while a value of 0.001 drops the Z to a minimum Z position.

KNOWN ISSUES AND LIMITATIONS
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Release 5.6.2 – March, 2018 (Win7; 32-Bit)
Release 6.0.2 – March, 2018 (Win10; 64-Bit)
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OVERVIEW
Low energy data collection

BUG FIXES
1.   Add support for low energy data collection (0-10eV).

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Release 5.6.1 – January, 2018 (Win7; 32-Bit)
Release 6.0.1 – January, 2018 (Win10; 64-Bit)
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OVERVIEW
    Critical Bug Fix Version

BUG FIXES
    1. Fix for image registration not working when acquiring More>Profile or More>Map.

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Release 5.6.0 – October, 2017 (Win7; 32-Bit)
Release 6.0.0 – October, 2017 (Win10; 64-Bit)

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OVERVIEW
    Windows 10 Support; Agilent Ion Pump Support; Image Registration at Analysis Position

NEW FEATURES
    UI
    1. SmartSoft-AES includes new high-resolution desktop icons.
    2. Menu Bar>Tools>System Configuration>Bypass Valve: Adds support of the upper chamber bypass valve (V10): V10 automates control of the upper chamber bypass valve during system bake.
    3. Menu Bar>Tools>System Configuration>Ion Pump: Adds Agilent ion pump support .
    4. Menu Bar>Tools>Bake and Sublimation: Adds AutoTool tasks: Start Bake; Start Sublimate; Start Degas.
    5. Menu Bar>Tools>Chart Recorder: The *Chart Recorder* implements a real-time chart history for tracking system parameters. The parameters to be monitored are configurable. The chart background color, line width, axes labels, and data markers are also configurable.

    System
    6. System>Vacuum>Pressure Log: Implements a permanent pressure log which records intro pressure, main chamber pressure, and upper chamber pressure. The pressure log is written to a file in the settings/log directory. Write interval is set and modified in the properties. This log can be archived and/or deleted without trouble.
    7. System>Intro Photo> IntroUSB Camera Model: Adds support for DFK 41BU02 in addition to DFx 41BU02.
    8. AES>Survey>Image Registration: Image registration is now available at multiple analysis positions using the Position List. Activation key required
    9. AES>Periodic Table: One can now edit acquisition region default energy window information stored in the element database. New elements can also be added: *Periodic Table>Popup Menu>Edit Data Base*...

    Hardware
    10. Hardware>Ion Gun: Adds AutoTool task to set ion gun beam state (Ion Gun:Beam State = Off | Standby | Blank | Sputter | Neutralize).

    BUG FIXES
    UI
    11. Menu Bar>Tools>Bake and Sublimation: The configuration flag used to pre-bake a system configured w/o an upper chamber (Has Upper Chamber=True) is moved from Bake properties.phi to ConfigManager properties.phi.
    12. Menu Bar>Tools>Bake and Sublimation: The main chamber pressure interlock is disabled during a system bake to prevent damage to the V9 isolation valve o-ring.
    13. Menu Bar>System>Zip Log Files: Fix issue where dialog is sometimes hidden under SmartSoft-TOF main window.

14. Menu Bar>System>Zip Log Files: Automatically close down the dialog after zipping files. Reduce the key stroke as we usually zip up one file at a time.
15. System>Intro Photo>GigE Camera: Fix issue with GigE camera so the camera doesn't require 'Device User ID' set to 'Intro' to work.
16. System>Vacuum>Diagnostics: Implement Turbo Speed Interlock for Dual Turbos; Intro turbo interlocked to V3, V6; Second turbo interlocked to V4, V8.
17. Sample>Stage>Drive to Position Tolerance: Increase tolerance of the R check for the decision to move or not. Previously the tolerance was 0.1 (dThetaDiff < 0.1) and now it is raised to 0.2 in the DLL.
18. Sample>Stage>Properties>Center of Rotation: Correctly adjust for the current x, y image shift values when calculating the center of rotation. This is not a problem if image shift is 0, 0 when the center of rotation is calculated.
19. Sample>Stage>Properties>Center of Rotation: The 'Test' center of rotation button is missing in previous version. The 'Test' center of rotation is now back using simple rotation steps of 120 degrees to visually check the center of rotation.
20. AES>Image Registration Retry: When image registration fails (hit edge or below threshold), IR performs and auto retry one time before displaying the manual IR retry dialog box.
21. Diagnostics>Read Hardware: Multiple read hardware buttons can now be active at the same time without negatively impacting system performance.

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Release 5.5.0 – January, 2017 (Win7)

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OVERVIEW

SmartSoft-AES V5.5.0: Support 64-bit SmartSoft-AES window program; Support V11

Note: This is the first version of SmartSoft-AES that supports both 32-bit and 64-bit installations. The 64-bit installation takes advantage of the larger memory address space and increased RAM size. This allows the SmartSoft software to better handle large data files and increased pixel display resolutions.

NEW FEATURES

System
1. System>System Glyph>V11: V11 support is added to the dual turbo pump option. V11 is the valve between the TMP and the Rough Pump. Note: Dual TMP option was added in V5.4

BUG FIXES

1. Menu Bar>Hardware>System Configuration>Intro Camera: Make it backward compatible and doesn't require users to re-select Intro Camera configuration. Previous Yes | No will be remapped to Canon | None.
2. System>Cold Cathode: The cold cathode gauge is shut down when pump intro is stopped (i.e. V3 Closed). This is done to protect the cold cathode from contamination when intro pressure is too high.
3. Map Setup>More Map: Only the number of frames field can be modified during a More Map. Other fields have been correctly disabled.
4. Ion Gun>Settings: Fix "Create Session" error on startup. This error occurs when Ion Gun reserved settings are missing (e.g. INITIAL, PREVIOUS).

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Release 5.4.0 – October 2016 (Win7)

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OVERVIEW
SmartSoft-AES V5.4.0: Support for New PHI Electronics (MOD 32-631 & MOD 781B); Support for New Hardware Configurations (EDS/EBSD, Dual TMP, GigE Camera); New Features; Bug Fixes

NEW FEATURES

UI
1. Menu Bar>Hardware>System Configuration->Intro Camera: Adds support for GigE camera.
2. Menu Bar>Hardware>System Configuration->E-Gun Control: Adds support for PHI MOD 32-631 E-Gun Control.
3. Menu Bar>Hardware>System Configuration->E-Gun Deflection: Adds support for PHI MOD 781B E-Gun Deflection.
4. Menu Bar>Hardware>System Configuration->Intro Camera: Support GigE camera.
5. Menu Bar>Hardware>System Configuration->Dual TMP: Adds support for Dual TMP. The second turbo pump option allows for simultaneously pumping on the intro chamber while differentially pumping the ion gun.
6. Menu Bar>Hardware>System Configuration->EDX: Adds support for EDX. Note EDX is controlled by a separate computer workstation. Set SEM>SEM Properties>Image>Input Signal to External during EDS operation.
7. Menu Bar>Hardware>System Configuration->EBSD: Adds support for EBSD. Note EBSD is controlled by a separate computer workstation. Set SEM>SEM Properties>Image>Input Signal to External during EBSD operation.
8. Menu Bar>System>Zip Log Files: Provide a tool to easily zip up system logs, application logs, and settings files for problem diagnostics.

System
9. Intro Photo>Properties...>Calibrate: The Intro Camera application now includes a simplified point & click interface which allows for drawing an area on the intro photo to calibrate the image. This point & click interface is also available to define the clipping area. Also new is the ability to import a BMP or JPEG image from and external camera source (e.g. an external microscope). This import feature can also be used to recalibrate a previous taken intro ".pho" photo file.
10. Valve Viewer>ToolBar>Large Pressure Display: The large pressure displays are shown in a sizable and movable window.
11. Valve Viewer: A second turbo pump is shown on systems configured with the Dual TMP option.

Sample
12. Position List>Toolbar>Lock Button: A Lock button is added to the position list which, when pressed, prevents editing the position list. The Lock button automatically gets pressed when running AutoTool.

SEM
13. SEM>Reduced Image: When Reduced Image is selected the SEM is automatically taken out of Auto Contrast mode. Auto Contrast mode is restored when Reduced Image is completed.
14. SEM>Auto Video: The Auto Video button now allows the operator to define the starting Brightness and Contrast values. Optimizing these values allows for a faster completion of the Auto Video routine. Default values: Brightness = 90.0; Contrast = 0.0

BUG FIXES

1. Menu Bar>Hardware>System Configuration: The default product ID is for the 38-101 (x8018) Data Acq. However, most AES systems are shipped with the 38-101A (x8021) Data Acq. This fix was added to the ConfigurationSetup.exe

2. SEM>KnobBox: When the Knob Box is configured but not connected (and not simulated); errors are continuously generated in the system log. This bug will cause the C drive to fill with log data over the course of a few days. Protection has been added to log only one error in the system log on startup.
3. AES>LabBook>Filename: The list of invalid characters now includes '~', '_', and '+'. SmartSoft has a special meaning for these three characters: '~' is used when a duplicate filename is found; '_' is used for acquisitions with multiple areas; and '+' is used for More filenames. The complete list of invalid characters is: '/\:*?<>|~_+'
4. Ion Gun>Properties>Blank Electron Beam During Sputter: This feature was missing from the UI in previous versions (it was available, however, in the Ion Gun>Properties>Properties.phi file). It is now back in the Ion Gun>Properties dialog.

KNOWN BUGS

1.

HELPFUL HINTS
1.

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Release 5.3.1 – December 2015 (XP, Win7)

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OVERVIEW
    SmartSoft-AES V5.3.1: AES Multiplier 'Park' mode; Bug Fixing

NEW FEATURES

    UI
    1. Menu Bar>Analyzer: EMS park mode. The AES Multiplier is now set to a 'Park' energy when not acquiring data. Typical value: 1000V. This feature is designed to extend the lifetime of the MCP

BUG FIXES

1. SEM>Auto Contrast: The Auto Contrast feature should be disabled when using Reduced Image. However the contrast and threshold values are not correct when auto contrast is de-selected. - Fixed
2. SEM>Rotation: Image rotation does not rotate around the center of the image as expected. - Fixed

HELPFUL HINTS
1. Entry fields must be 'terminated' either by selecting the <Enter> key or by moving to another parameter field. If the application is exited before the value is terminated the change will not be saved.

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Release 5.3.0 – August 2015 (XP, Win7)

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OVERVIEW
    SmartSoft-AES V5.3.0 adds: 0-3200eV Analyzer Range; EDS Support; Common UI Feature; Bug Fixing

NEW FEATURES

<u>UI</u>
1. Menu Bar>Tools>System Log: Backup copies of the system log are now stored in the C:\SmartSoft-AES\Log directory
2. Status Bar: The size of the status line fields can now be customized by clicking and dragging the edge of the field. Fields can be returned to their default size by selecting the *Reset Default Size* option from the status line context menu.
3. Status Bar>Highlight: The highlighting tool indicates which menu items are *Settings* and which items are *Properties*. *Settings* are loaded as a group of values using the Settings>Load command; while *Properties* are common across the entire system.
4. Menu Bar>System>E-Mail Notification: One can now send custom email messages or text messages during the running of an AutoTool sequence. This is accomplished by using the AutoTool *Send E-Mail* task.
5. Menu Bar>System>Coffee Timer: This feature adds the capability to schedule the processing of an AutoTool task at a specified day and time.

<u>AutoTool</u>
6. Menu Bar>Automation>AutoTool: The *Active* list item adds the ability to deselect a task from the sequence without permanently deleting the task.

<u>System</u>
7. System>Intro Camera: External image files (.bmp, .jpg) can now be imported and used to navigate on the sample.

<u>Sample</u>
8. Sample>Position List: The 3-point alignment routine is now compatible with die navigation. This support is similar to that found on the SMART-Tool
9. Samplet>Stage: A warning message is now display when the tilt is greater than 30 degrees.

<u>SEM</u>
10. SEM: A new Settings Editor is available for viewing and editing the settings text files. The Settings Editor is accessed through a context menu from the Settings Box. This Settings Editor is available for all hardware applications.
11. SEM: 'V9 Open' & 'V9 Close' controls are added to SEM application.
12. SEM: The knob box can now be customized to change the behavior of the *pressed* and *un-pressed* knob states. Many users find it easier to use the *pressed* state for coarse moves and *un-pressed* state for fine moves. (SmartSoft-AES\Settings\Properties\Properties.phi)
13. SEM>Properties>Image: Input Signal: Internal|External support is added for systems configured with an EDS option.

<u>AES</u>
14. AES>Data Manager>Properties...>Filename: The auto file naming feature has been expanded to include digits, date, time, and delimiter type
15. AES>Survey: The acquisition range has been extended to 0-3200. This requires an analyzer control upgrade from the 20-378 to the 20-378A. The 20-378 has a range of 0-2500; compared to the 20-378A which has a range 0-3200. Note: the analyzer control model number is set in the hardware configuration menu.
16. AES>Profile>Test Acquire: Test Acquire now supports 'Area' and 'Line' analysis areas. The analysis area mode can be selected from the SEM context menu.

<u>Hardware</u>
17. Hardware>Ion Gun: The emission current startup ramping is optimized to improve the lifetime of the ionizer.

18. Hardware>Ion Gun>Diagnostics: Systems configured with the 20-066 ion gun control now take advantage of an extended set of diagnostics read backs. Note: this may require a firmware upgrade.

BUG FIXES

1. Sample>Stage: The accuracy of Eucentric Tilt Correction has been improved.
2. SEM>SEM: Cannot set the beam voltage to 10.000kV, however 9.99kV works. This problem only existed on some 710 instruments. - Fixed
3. SEM>SEM>Stigmation X, Y are not loaded correctly from data file. - Fixed
4. AES>Data Manager: Every "More" acquisition is counted as a file number. Start with Test1, then do 5 "More" acquisition (Test1+1.spe, Test1+2.spe, ...) and next valid filename is Test6.spe. Test2.spe-Test5.spe are missing. - Fixed
5. AES>Profile>Test Acquire: The test acquire spectrum becomes distorted if test point moved during test acquisition. - Fixed
6. AES>Map: Immediately after restarting the SmartSoft_AES "More" map does not work. Acquire a map acquisition and "More" is working again. - Fixed
7. AES>Map Display: Beam Voltage is missing in the annotation fields displayed at the bottom of a map display. - Fixed
8. Hardware>Ion Gun: Unable to perform a Timed Sputter when the gun is in the Neutralize mode. - Fixed
9. Menu Bar>Tools>Analyzer and Detector...: No record of AES multiplier voltage in "File Information" parameters. - Fixed
10. Menu Bar>Tools>Analyzer and Detector...: The AES multiplier voltage is not set correctly after conditioning routing. - Fixed

KNOWN BUGS
1. Some USB thumb drives can cause a loss of communication with the Bertan.

NOTES
1. SmartSoft-AES can now be run on either a 32-Bit or 64-Bit OS. Note: This feature can only be configured by your ULVAC-PHI service engineer.

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Release 5.2.1 - July, 2014 (XP, Win7)
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OVERVIEW
SmartSoft-AES V5.2.1 adds: Minor Acquisition Improvements; Bug Fixing

NEW FEATURES
AES
1. AES>Profile: Profile data is updated more frequently during profile acquisitions. Data is added to the Profile Viewer at the end of each region instead of waiting for all regions (i.e. the end of the cycle).
2. AES>Map: Selecting a "Frame Stop" or "Next Frame" now completes all scans of a frame (peak, background, and background for 3 point map) before stopping or moving to the next region. Previously, a "Frame Stop" would stop at the end of a scan. In this case if all scans of a frame were not completed, the partial frame of data was discarded.

FIXED FROM PREVIOUS VERSION
1. SEM>SEM Image: Memory management has been optimized when working with large SEM image files (2048x2048 pixels, and 4096x4096 pixels). This optimization greatly improves the ability to save, display, and perform image registration using large images. However, there are still basic limitations imposed by

the Microsoft Operating System. It is recommended to display only one 4096x4096 image in SmartSoft-AES at a time.
2. SEM>SEM Image: Image persistence now includes an "On/Off" selection. In the "On" mode the current image (weighted 50%) is added to the summation of all previous images (weighted 50%). This summation continues until the persistence is set to "Off".
3. SEM>SEM Image: Reduced imaging w/persistence has been fixed.
4. AES>Profile: The "Delay After Sputter" feature has been changed to pause before performing the image registration instead of after the image registration. This change allows the sample to "settle" after sputtering and before performing the IR correction.
5. AES>Survey>More Acquire: Analysis points used during an acquisition are now correctly reloaded into the "Area Define" application prior to a "More" acquisition. This fix also applies to Profile and Line acquisitions.
6. AES>Map>More Acquire: Deselected regions in the region list are now correctly skipped during a more map acquisition.
7. AES>Map: The "Stop" button was intermittent ignored. This has been fixed.

HELPFUL HINTS
1. Entry fields must be 'terminated' either by selecting the <Enter> key or by moving to another parameter field. If the application is exited before the value is terminated the change will not be saved.

KNOWN ISSUES AND LIMITATIONS

1.

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Release 4.2.0 – March 2014

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OVERVIEW
SmartSoft-AES V5.2 adds support for a 15-5000 hot and cold stage option.

NEW FEATURES

General UI
1. User Settings
   a) User settings combo boxes now store a history of the 5 most recently used user settings. These recent settings are displayed at the top of the combo box list followed by a separator. Also, reserved settings are now grouped at the bottom of the combo box list. In previous versions the reserved settings were scattered throughout the list appearing in alphabetical order.

Sample
2. Sample>Stage: 15-5000 Stage (Optional)
   a) The 15-5000 H/C stage from the VersaProbe II system is now supported as an option for the AES 710 system. Note: with the 15-500 stage a sample positioned normal to analyzer/e-gun is at a 45 degrees tilt angle.

FIXED FROM PREVIOUS VERSION
1. SEM>SEM: Magnification value missing from .sem files. Because of this MultiPak display the wrong magnification on the image. – Fixed
2. SEM>SEM: SEM Persistence On/Off is now supported. Persistence signal averages the current fame of SED data to a composite of all previous frames.

HELPFUL HINTS

1. Entry fields must be 'terminated' either by selecting the <Enter> key or by moving to another parameter field. If the application is exited before the value is terminated the change will not be saved.

KNOWN ISSUES AND LIMITATIONS

1.

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Release 5.1.0 – September 2013
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OVERVIEW
   SmartSoft-AES V5.1 adds: Video Chain 38-101A Improvements; Real-time Histogram Equalization; Reduced Image; Bug Fixing.

NEW FEATURES

<u>General UI</u>
1.
<u>Sample</u>
2. Sample>Vacuum: Software vacuum interlock: Close V9 if the chamber vacuum pressure is over the interlock
3. Sample>Vacuum: Software vacuum interlock: Close V4 if TMP RPM is under the interlock
<u>SEM</u>
4. SEM>SEM>E: Enhance Contrast function for live SEM image
5. SEM>: Add support new 38-101A
6. SEM>SEM>Reduced Image: Added for improved image display rate during precision tuning.
7. SEM>Beam V: Regulate the ramping rate of E-gun Beam voltage (Default value is set to 1kV/sec)
<u>AES</u>
8. Analysis Area: Allow Load Area Setting in AutoTool. Allow for more fequent IR during acquisitions w/many analysis positions; Also added for Analysis Line
9. Analysis Areas: Hide the analysis areas that are not selected (instead of setting to black color). Added to Tools>System Colors>Position Inactive=None
10. Set the number of "More" cycles in AutoTool
11. Image Registration: Display the confidence threashold as parameter in UI.
12. Image Registration: Save IR parameter when SS-AES is restarted.
<u>Hardware</u>
13.

FIXED FROM PREVIOUS VERSION
1. SEM: Attempting to Load Setting w/invalid setting name results in a partial load of parameters (bad load).
2. MCD: Usage Time is always 0.0 hrs.
3. Bake: Request to change bake sequence to simulate upper chamber pump and gauge.
4. Z-Align: Energy shift after cardrack recycle.
5. Z-Align: 1ev Energy Shift
6. Survey: eV/Step not recorded correctly unless default value is also set.
7. More Map Fails when adding a new region
8. More Profile fails when adding a new region
9. Bake: Unable to enter 'Required Pressure' value

HELPFUL HINTS

1. Entry fields must be 'terminated' either by selecting the <Enter> key or by moving to another parameter field. If the application is exited before the value is terminated the change will not be saved.

KNOWN ISSUES AND LIMITATIONS

1.

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Release 5.0.0 – November 2012
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OVERVIEW
   SmartSoft-AES V5.0 supports next generation scanning and data acquisition electronics for the AES 710 system. This configuration also replaces the *Watcher* program used for vacuum control and system bake with functionally contained entirely within SmartSoft-AES.

NEW FEATURES

General UI
1. Vacuum and Bake: Function are now controlled entirely through SmartSoft-AES

System
2. System>Transfer: Add support for one-button sample transfers on systems configured without Watcher (i.e. systems that are configured with the AVC:auto valve control)

Sample
3. Sample>Sample Viewer>Toolbar>Grab Cursor: Interactively pans the Sample Viewer image by holding down the <left mouse> and moving the mouse cursor.
4. Sample>Stage: Add support for PCI version of MEI board (15-680 stage only).
5. Sample>Position List>Create Position...>Point Generation: Support is now available to create multiple positions using a number of different fill patterns (e.g. circle, cylinder, square). The default fill pattern creates evenly spaced points across the current FOV.

SEM
6. SEM>SEM Viewer>Toolbar>Grab Cursor: Interactively pans the SEM Viewer image by holding down the <left mouse> and moving the mouse cursor. This interactive move is accomplished by deflecting the electron beam (i.e. x, y image shift) and is only active when the FOV is smaller than the FOV Crossover value.
7. SEM>SEM Viewer Toolbar>Histogram: Add histogram display which shows the gray-scale distribution of the SEM image.

FIXED FROM PREVIOUS VERSION

HELPFUL HINTS
1. Entry fields must be 'terminated' either by selecting the <Enter> key or by moving to another parameter field. If the application is exited before the value is terminated the change will not be saved.

KNOWN ISSUES AND LIMITATIONS

1.