SmartSoft-AES Software Release Notes
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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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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

<u>UI</u>
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.

<u>System</u>
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.

<u>Sample</u>
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.

<u>SEM</u>
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

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HELPFUL HINTS
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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

General UI
1.
Sample
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
SEM
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)
AES
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.
Hardware
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.