Firmware Release Notes

1.13.3   **2024-08-20 - Compatible with MotionCam-3D (Color), PhoXi 3D Scanner Gen 2 (shipped after Nov 2021), Alpha 3D Scanner**

SCAN-5290   Resolved an issue, where the device occasionally produces non-monotonic Frame's timestamp.

SCAN-5222   Firmware update for the projection unit

1.13.2   **2024-07-08 - Compatible with MotionCam-3D (Color), PhoXi 3D Scanner Gen 2 (shipped after Nov 2021), Alpha 3D Scanner**

SCAN-5236   Improved dynamic range for MotionCam-3D product line's image sensor in Scanner mode. Note: This improvement is applicable only to MotionCam-3D devices in production since June 2024.

SCAN-5233   Improved texture filtering on MotionCam-3D devices to reduce noise in Scanner mode. Note: This improvement is applicable only to MotionCam-3D devices in production since June 2024.

SCAN-5231   Fixed an issue where changes to the "Shutter Multiplier" (in Scanner Mode section) were not applied correctly; "Shutter Multiplier" is now fully functional in both 2D and Scanner modes on the MotionCam-3D product line.

SCAN-5230   Resolved an issue with startup user set ("UserSetDefault") not being properly loaded .

SCAN-5229   Texture images in 2D mode (for "Texture Source" options other than Color) are now treated the same as in Scanner and Camera modes.

SCAN-5220   Fixed a crash on MotionCam-3D product line devices. It occurred when scanning with DEFAULT profile settings, changing the Texture Source for Scanner Mode to Computed, setting the source, and then switching the Operation Mode to Scanner and triggering a scan.

SCAN-5216   Precision Time Protocol (PTP) clock server: Resolved a network driver issue that would occasionally cause the timestamp to be incorrectly reported as 1970-01-01 00:00:00.

SCAN-5210   Firmware update for the 2D camera unit in the Alpha 3D Scanner product line.

SCAN-5199   The "Interreflection filter" is now applied only when "Coding Strategy" is set to "Interreflections". Choosing this filter while having a different setting in "Coding Strategy" does no longer change the "Coding Strategy" to "Interreflections".

SCAN-5194   Firmware update for the projection unit.

SCAN-5146   The enhanced algorithm of computation of normals is now robust to the coordinate space origin (controlled via the "Camera space" setting) and eliminates diagonal artifacts. "Normals Estimation Radius" is uniformly set to 1 by default across all factory profiles and product lines.

SCAN-5143   Introduced support for new hardware revisions of the processing unit, which is set for production deployment later this year.

SCAN-5039   Extended thermal calibration model for even more stable and reliable scanning performance in varying temperature conditions. Applicable to devices built and calibrated after July 8th, 2024.

1.13.1   **2024-05-30 - Compatible with MotionCam-3D (Color), PhoXi 3D Scanner Gen 2 (shipped after Nov 2021), Alpha 3D Scanner**

SCAN-5179 GigE Vision interface: Exposed GevSCPD feature. GevSCPD controls the delay (in the GEV timestamp counter unit) between each packet for the stream channel. This increases the transmission time of the data and can be used as a flow-control mechanism if the application or the network infrastructure cannot keep up with the packets coming from the device.

SCAN-5178 Resolved issue with "Coding Strategy" = *Sparse* on MotionCam-3D devices equipped with the bulkier camera unit.

SCAN-5168 Enhanced treatment of defective pixels in the MotionCam-3D product family's image sensor, resulting in artifact-free scans in both Scanner and Camera mode.

SCAN-5163 Improved marker pattern recognition for "Texture Source" = *Color*, reducing pose estimation uncertainty by approximately 10x with our new algorithm.

SCAN-5139 Added a new option *2576x1460* for the Resolution (Color Settings) of the ColorCameraImage used as Texture (Color in the 2D image tab).

1.13.0 **2024-05-02 - Compatible with MotionCam-3D (Color), PhoXi 3D Scanner Gen 2 (shipped after Nov 2021), Alpha 3D Scanner**

SCAN-5165 Implemented a new point cloud filtering method that removes inaccurate 3D points more accurately and faster. This method is now enabled by default on all Photoneo 3D sensors.

SCAN-5162 Introduced a new "Coding strategy" *High-frequency* suitable for scenes containing reflective surfaces. Available across all Photoneo 3D Sensors. On MotionCam-3D product line it is available for both *Scanner* and *Camera* mode.

SCAN-5154 Detailed internal logging of settings changes for easier troubleshooting and faster problem resolution.

SCAN-5103 GigE Vision interface: Fixed behavior: When the Normal component is enabled and "Normals Estimation Radius" = 0, all zeros are now reported as expected.

SCAN-5083 Implemented enhanced normals computation algorithm. Delivering faster processing, improved quality, and crispier point clouds. On MotionCam-3D product family, "Normals Estimation Radius" is set to 1 by default in all factory profiles.

SCAN-5070 GigE Vision interface: Removed custom Reprojection component together with "Scan 3d Output Mode" = *Calibrated C*. Fully replaced by the new standard components Coordinate Map (A & B) and corresponding "Scan 3D Output Mode" = *Projected C*.

SCAN-5069 GigE Vision interface: Removed custom Coordinate Transformation component. Access coordinate transformation data directly through Chunk data selection. The full list of chunk data available:
- Timestamp
- Timestamp Latch Value
- Primary Camera To Coordinate Space Transformation
- Current Camera To Coordinate Space Transformation
- Main Camera Calibration Data
- Color Camera Calibration Data
- Temperature

SCAN-5065 GigE Vision interface: Removed Irregular grid from "Output Topology" options. It remains a PhoXi Control-only feature. When using the GigE Vision interface for communication with devices from the MotionCam-3D product family, the default "Output Topology" is set to *Raw*.

SCAN-5059 Fixed Current camera frustum reporting when using "Output Topology" = *Irregular* on MotionCam-3D product family.

SCAN-5058 GigE Vision interface: Added support for "Scan3dCoordinateMapValueAll" and "CoordinateMapSelector" features; both available only with "Scan 3d Output Mode" = Projected C and "CoordinateMapEnable" = *True*.

SCAN-5056 Introduced a new processing setting "Hole filling". If enabled, this filter interpolates missing 3D points based on values from neighboring points, resulting in a more complete and continuous surface representation. Default value: False.

SCAN-5044 GigE Vision interface: Added <pMin> and <pMax> nodes for Exposure setting allowing seamless Exposure setup in 3rd party software (e.g. HALCON or Aurora Design Assistant™)

SCAN-5038 GigE Vision interface: Normal component is now by default reported with "Pixel Format" = *Coord3D_ABC_32f*. For faster transfer of data and time-demanding applications, "Pixel Format" = *Coord3D_AC8* is still available.

SCAN-5037 GigE Vision interface: All available intrinsic parameters can now be retrieved via corresponding Coordinate settings for:

- CurrentCamera: Current (effective) camera settings; depends on the "CameraSpace" setting selector.
- CurrentPrimaryCamera: Parameters of the color camera with which the color texture was created.
- CurrentColorCamera: Parameters of the camera which the original depth map (before reprojection) was created with.

SCAN-5035 Introducing new factory profiles for MotionCam-3D Color: STATIC_SCENE_TRANSPARENT, DYNAMIC_SCENE_DARK_GLOSSY, and STATIC_SCENE_DARK_GLOSSY, showcasing the enhanced capabilities of scanning scenes with transparent, translucent, glossy or dark objects with challenging interreflections. Additionally, adjusted "Noise filtering for the shiny material" profile for the PhoXi 3D Scanner and Alpha 3D Scanner product lines.

SCAN-5014 GigE Vision interface: The Confidence component is now correctly reported in "Pixel Format" = *Confidence8* with values in the range 0-255.

SCAN-5003 GigE Vision interface: The Range component is now by default reported with "Pixel Format" = *Coord3D_ABC32f* and "Scan 3D Output Mode" = *Calibrated_ABC_Grid*. For faster transfer of data and time-demanding applications, "Pixel Format" = *Coord3D_C32f* is still available as an option when "Scan 3d Output Mode" = *ProjectedC*. The (obsolete) option "Scan 3d Output Mode" = *CalibratedC* is no longer available.

SCAN-4991 Resolved issues with Custom White Balance computation on MotionCam-3D Color

SCAN-4978 GigE Vision interface: Intensity component now reports the appropriate Pixel Format (Mono16/Mono12/Mono10/RGB8) based on the "TextureSource"/"CameraTextureSource" selection.

SCAN-4973 Added missing settings descriptions across all product families.

SCAN-4940 GigE Vision interface: Added support for the new standard components *Coordinate Map A*, and *Coordinate Map B*, aligned with GenICam SFNC v2.7.4 for "Scan 3D Output Mode" = *Projected C*, replacing obsolete Reprojection component from FW 1.12 and lower. The use of the maps is further illustrated in the public examples available at github.com/photoneo-3d

SCAN-4925 All factory profiles for the Alpha 3D Scanner product line now use the "Calibration Volume Only" = *True* by default.

SCAN-4806 Added support for a Precision Time Protocol (PTP) clock server, enabling the device to serve as an accurate time source. This feature ensures precise synchronization of clocks between multiple Photoneo sensors across the network. This is critical for applications requiring exact time alignment when using, for example, encoders or conveyor belts.

SCAN-4767 Introduced a new processing setting "Glare Compensation" to mitigate wavy point cloud artifacts stemming from super-direct reflections, particularly on challenging reflective surfaces, with additional runtime impact (e.g. 6 ms per frame for MotionCam-3D using "Output Topology" = *Raw*). Default value: *False*.

SCAN-4744 GigE Vision interface: Added support for User-Sets functionality.

SCAN-4743 GigE Vision interface: Added support for user-defined device identifier "DeviceUserID".

SCAN-4672 GigE Vision interface: All intrinsic parameters of the main and the color camera are exposed via Chunk Data Control.

SCAN-4620 Introduced a new laser projection mode, leveraging Photoneo's unique COMPIS (Computational Image Sensor) and the Parallel Structured Light technology to enhance signal readouts on transparent, translucent, and glossy surfaces. Accessible through "Coding Strategy" = *Sparse* (for Camera mode) across all MotionCam-3D product family devices. Recommended for static scenes only.

SCAN-4551 Introduced a new processing setting "Pattern Code Correction" leading to a more complete point cloud. Available for all products on three levels:

- Off: suitable for time-demanding applications (no smoothing is applied)
- Medium: smoothing with little runtime cost (default),
- Strong: significant smoothing with additional runtime cost (e.g. 6 ms per frame for MotionCam-3D using "Output Topology" = *Raw*). Recommended in combination with "Coding Strategy" = *High-frequency*.

SCAN-2799 Resolved Texture source switch from *Focus* to *Computed* on PhoXi 3D Scanner devices.

1.12.2 — **2023-12-6 - Compatible with MotionCam-3D (Color), PhoXi 3D Scanner Gen 2 (shipped after Nov 2021), Alpha 3D Scanner**

SCAN-4938   Firmware update for the projection unit.

1.12.0 — **2023-11-20 - Compatible with MotionCam-3D (Color), PhoXi 3D Scanner Gen 2 (shipped after Nov 2021), Alpha 3D Scanner**

SCAN-4924   Introduced the "Remove False Colors" parameter in the Color Settings section of MotionCam-3D Color, providing a solution to address falsely colored points caused by occlusions in the perspective of the color camera unit.

SCAN-4842   Introducing new factory profiles for MotionCam-3D Color: DYNAMIC_SCENE_COLOR_REPROJECTION and STATIC_SCENE_COLOR_REPROJECTION, showcasing the new capabilities of reprojecting the DepthMap into the internal 2D RGB camera unit perspective.

SCAN-4835   Added support for "Full grid" Output Topology applicable in Camera Mode on all products from MotionCam-3D product family. Leveraging the native (2 Mpix) resolution of the proprietary image sensor (as in Scanner Mode), the enhanced point cloud reconstruction algorithm delivers improved completeness and accuracy in the resulting point cloud.

SCAN-4795   Enhanced communication with the internal camera unit for improved reliability.

SCAN-4790   General point cloud reconstruction quality improvements across all Output Topologies in the Camera Mode for MotionCam-3D product line.

SCAN-4778   Enhanced Coordinate Settings: Introduced new "Camera Space" setting, set by default to "PrimaryCamera". For MotionCam-3D Color, the "ColorCamera" option enables reprojecting the DepthMap into the internal 2D RGB camera unit perspective, hence obtaining the direct relationship between Texture and DepthMap also when Texture Source is set to "Color". This enhancement streamlines operations, such as segmenting the object of interest in the RGB texture and selectively accessing the corresponding 3D points.

SCAN-4751   GigE Vision interface: Addressed DiscoveryAckDelay issues, resolved default behavior inconsistencies, and implemented register persistency.

SCAN-4746   GigE Vision interface: Added support for standard TLParamsLocked feature used by the Transport Layer to prevent critical features from changing during acquisition.

SCAN-4740   GigE Vision interface: Added support for standard Scan 3D Control features: Scan3dDistanceUnit, Scan3dCoordinateSystem, Scan3dOutputMode, Scan3dCoordinateSelector, Scan3dCoordinateScale, Scan3dCoordinateOffset, Scan3dInvalidDataFlag, Scan3dInvalidDataValue.

SCAN-4696   Resolved minor initialization issues for the PhoXi 3D Scanner product line in cases when Resolution ="(1032x772)" in the startup profile.

SCAN-4488 Redefined sampling topologies of the resulting point cloud in Camera Mode defined by the Output Topology for MotionCam-3D product family:
Raw - points are now organized into a checkerboard grid,
Irregular grid - complements the missing checkerboard grid through interpolation in PhoXi Control,
Regular grid - shares the same sampling locations as Irregular grid, however, all 3D points of this topology are properly estimated (i.e. no interpolation is involved)

SCAN-4425 Fixed occasional misconfiguration of Laser power when transitioning between Scanner and Camera modes on MotionCam-3D product family.

SCAN-4304 Enhanced internal logging mechanism allowing seamless troubleshooting.

SCAN-4158 GigE Vision interface: Revamped streaming protocol using scatter-gather buffers, with support for multipart chunks, packet delay, and batching.

1.11.0 — **2023-09-06 - Compatible with MotionCam-3D (Color), PhoXi 3D Scanner Gen 2 (shipped after Nov 2021), Alpha 3D Scanner**

SCAN-4718   GigE Vision interface: Fixed resolution reporting with different Output Topologies on MotionCam-3D product family. Note that Output Topology = Irregular grid is a PhoXi Control-only feature. For GigE Vision, it behaves the same as Output Topology = Raw.

SCAN-4706   Firmware update for the projection unit.

SCAN-4665   GigE Vision interface: Implemented discovery acknowledge packet broadcast if the client allows discovery acknowledge broadcast and the client subnet is different than the device subnet.

SCAN-4650   GigE Vision interface: Fixed incorrect payload size and ColorCameraImage resolution caching.

SCAN-4631   Pattern Decomposition Reach parameter added to the set of Processing settings for MotionCam-3D product family.

SCAN-4540   Resolved minor initialization issues for MotionCam-3D product family in cases when Operation Mode = Scanner in the startup profile.

SCAN-4472   GigE Vision interface: Marker space transformation (matrix) is now available as a selectable frame component CoordinateTransformation.

SCAN-4462   Fixed Scan Multiplier functionality in Scanner Mode for MotionCam-3D product family.

1.10.1 2023-06-01 - Compatible with MotionCam-3D (Color), PhoXi 3D Scanner Gen 2 (shipped after Nov 2021), Alpha 3D Scanner

SCAN-4588   Experimental setting Ambient Light Suppression Compatibility Mode was removed.

SCAN-4481   Minor improvements of GigE Vision interface. Added support for the standard feature DeviceFirmwareVersion. Enhanced DeviceManufacturerInfo now mirrors the information available via PhoXi API in PhoXiDeviceInformation, including attributes such as "Color", and "Alpha".

1.10.0 2023-05-10 - Compatible with MotionCam-3D (Color), PhoXi 3D Scanner Gen 2 (shipped after Nov 2021), Alpha 3D Scanner

SCAN-4500   All factory profiles for the MotionCam-3D product family now use the enhanced Interreflections coding strategy by default.

SCAN-4480   The Computed texture is now returned in 16-bit unsigned ints, the same as any other texture variant.

SCAN-4466   The image sensor of the MotionCam-3D product family now offers an increased dynamic range in Scanner mode resulting in significantly improved performance in challenging lighting conditions.

SCAN-4534   Fixed a bug affecting the Pattern Decomposition Reach algorithm. The quality of point-filtering has been enhanced for both Small and Large presets.

SCAN-4449   Enhanced Ambient Light Suppression algorithm on PhoXi 3D Scanner bringing extreme performance boost in challenging lighting conditions. With the addition of a new maximal value of the Shutter Multiplier parameter (50), the algorithm delivers an unprecedented performance even in the most challenging conditions.

SCAN-4431   Fixed a missing texture bug on MotionCam-3D in Scanner mode that sporadically occurred when the setting Texture Source was set to Computed.

SCAN-4403   Fixed a rare bug that occurred when trying to recognize marker patterns and caused the device to go into an infinite loop.

SCAN-4398   The Exposure (Color Settings) of the RGB camera unit of MotionCam-3D Color can now be set to values lower than 10ms (independently from the 3D data acquisition).

SCAN-4371   Improved marker recognition algorithm now supports Regular topology of Camera mode on MotionCam-3D product family. Please note that for the Camera mode, markers should be 1.5x larger than in the Scanner mode to accommodate the reduced resolution of 1120x800. To ensure optimal performance, we recommend using the REV-23A version of Photoneo marker patterns which are available in PhoXi Control 1.10.0.

SCAN-4358   Introducing five new factory profiles for MotionCam-3D Color: DYNAMIC_SCENE_COLOR, DYNAMIC_SCENE_GRAYSCALE, DYNAMIC_SCENE_2D, STATIC_SCENE_COLOR, STATIC_SCENE_MARKER_SPACE. These new profiles are designed to showcase the different capabilities of the device, providing a seamless customer experience tailored to specific use cases.

SCAN-4318   Regular topology outputs on MotionCam-3D in Camera mode are now fully consistent, with each output being computed directly in the desired resolution of 1120x800.

SCAN-4317   MotionCam-3D product family now supports LED as Texture Source also in Camera mode. Similarly to the Color option, an additional image illuminated with the LED flash is captured by the image sensor.

SCAN-4256   Improved depth accuracy and robustness against artifacts when using Coding Quality = Ultra.

SCAN-4225   The projection unit's firmware has been updated to allow for a more advanced error-reporting mechanism.

SCAN-4192   Support for Alpha 3D Scanner.

SCAN-4155	Added support for GigE Vision 2.1 standard, providing a more streamlined and efficient experience with third-party software.
SCAN-3972	MotionCam-3D Color freerun stability was improved.
SCAN-3914	Scan timestamp creation was unified across all Photoneo 3D Sensors.
SCAN-3859	Improved robustness of temperature readout from the projection unit control board.
SCAN-3241	For the MotionCam-3D product family, we have introduced a new error message "Inconsistent laser interlock configuration" which notifies the user about any wrong Laser Interlock feature configuration of the device. In this case, contact our support team at the Help Center.
SCAN-3240	Hardware trigger feature is now available on the PhoXi 3D Scanner.
SCAN-2807	The Texture on the MotionCam-3D in the Regular topology option is now consistent with the mesh used for the point cloud.

1.9.4   **2022-11-15 - Compatible with MotionCam-3D (Color)**

SCAN-4203   Adjusted default values of Red, Green, and Blue factors of White Balance (Color Settings).

SCAN-4083   Firmware updates for the projection unit.

1.9.3   **2022-09-12 - Compatible with MotionCam-3D (Color)**

SCAN-3854   Profiles saved on MotionCam-3D Color can be applied to MotionCam-3D.

1.9.2   **2022-08-12 - Compatible with MotionCam-3D (Color)**

SCAN-3646   Improved scan timestamp mechanism on MotionCam-3D taking into account the possible clock shift stemming from the internal 2D camera unit.

SCAN-3491   Support for MotionCam-3D Color

1.8.1   2022-04-29 - Compatible with MotionCam-3D

SCAN-3621   Added a new setting LED Shutter Multiplier allowing the user to control separately the exposure time used for Texture image acquisition.

SCAN-3575   Fixed startup profile retention after the restart of the device for all devices built upon the new operating system platform (YT) supporting A/B partition scheme updates.

SCAN-3553   Laser Safety Interlock configuration was modified to persist after a factory reset of the device.

SCAN-3481   Optimized 3D reconstruction algorithm leading to 3.6 times faster 3D data computation.

1.7.4   **2021-12-21 - Compatible with MotionCam-3D**

SCAN-3416   Fixed a bug causing a crash on MotionCam-3D after hitting Trigger Scan in 2D mode.

SCAN-3344   The hardware trigger mode on MotionCam-3D was modified to not send an output trigger signal on disconnect.

SCAN-3332   Improvements implemented to not compromise FPS (the scanning speed) of MotionCam-3D

SCAN-3326   Implemented enhanced 3D reconstruction algorithm to avoid possible numerical issues leading to wavy point clouds.

SCAN-3306   The Daisy chain can now be activated in three ways: through the Software Trigger button in PhoXi Control (GUI), by calling TriggerFrame from API, or by GPIO input signal.

1.5.7   **2021-12-03 - Compatible with MotionCam-3D**

SCAN-3305   Fixed internal setting that was causing problems with trigger output readout for hardware trigger on MotionCam-3D

1.5.6   **2021-10-21 - Compatible with MotionCam-3D**

SCAN-3251   Fixed problem with multiple acquisitions caused by one signal on daisy-chained devices.

1.5.5   **2021-10-01 - Compatible with MotionCam-3D**

SCAN-2838   Introduced Hardware trigger feature on MotionCam-3D with an option to switch between falling and rising edges for the hardware trigger signal.

1.5.4   **2021-08-31 - Compatible with MotionCam-3D**

SCAN-3100   Fixed ShutterMultiplier behavior on MotionCam-3D in Scanner mode

SCAN-2974   Fixed a bug related to laser pattern projection that was causing "wavy" regions within a point cloud.

SCAN-2507   Added Laser Interlock Safety feature support for MotionCam-3D.

1.5.3   **2021-05-29 - Compatible with MotionCam-3D**

SCAN-3029   Firmware update for the internal 2D camera unit.

1.4.3   **2021-03-03 - Compatible with MotionCam-3D**

SCAN-2801   Fixed an occasional bug causing patterns to be projected in the wrong order on MotionCam-3D in Scanner mode.

SCAN-2654   Extended set of Exposure times in Camera mode for MotionCam-3D.

1.4.2   **2021-01-15 - Compatible with MotionCam-3D**

SCAN-1822   Support for MotionCam-3D

1.2.39   **2024-08-20 - Compatible with PhoXi 3D Scanner (Gen 1, Gen 2)**

SCAN-5276   Enhanced communication with internal camera unit, eliminating occasional issues for improved reliability.

SCAN-5222   Firmware update for the projection unit.

1.2.38   **2023-09-06 - Compatible with PhoXi 3D Scanner (Gen 1, Gen 2)**

SCAN-4719   Information about the OS platform (LT) for PhoXi 3D Scanners is now reported in the device's description.

SCAN-4706   Firmware update for the projection unit.

1.2.37   **2022-11-15 - Compatible with Photoneo 3D Scanner (Gen 1, Gen 2)**

SCAN-4083   Firmware update for the projection unit.

SCAN-4064   Improved quality of temperature readout from the projection unit control board.

1.2.36   **2022-03-30 - Compatible with PhoXi 3D Scanner (Gen 1, Gen 2)**

SCAN-3575   The imported startup profile selection remains the same after the restart of the device.

SCAN-3553   The laser safety interlock configuration persists after a factory reset of the device.

SCAN-2589   More robust handling of errors related to the internal camera unit.

1.2.34   **2021-12-08 - Compatible with PhoXi 3D Scanner (Gen 1, Gen 2)**

SCAN-3326   Implemented an enhanced 3D reconstruction algorithm to avoid possible numerical issues leading to wavy point clouds.

1.2.33   **2021-11-10 - Compatible with PhoXi 3D Scanner (Gen 1, Gen 2)**

SCAN-3150   Introduced support for the new processing units with the new underlying platform.