Security Systems

BOSCH

From			Nuremberg
BT-VS/MKP-XPT	Product Management		07.05.2024

Release Letter

Products:	***H.264/H.265 Firmware for*** ***CPP7.3 HD/MP cameras***
Version:	***7.89**.0045*

This letter contains latest information about the above-mentioned firmware version.

1 General

This firmware release is a maintenance release based on FW 7.89.0045.
It is an upgrade for CPP7.3 based cameras only.

Changes since last release are marked in blue.

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2   Applicable products:

- AUTODOME IP 4000i
- AUTODOME IP 5000i
- AUTODOME IP starlight 5000i (IR)
- AUTODOME IP starlight 5100i (IR)
- AUTODOME IP starlight 7000i
- DINION IP 3000i
- DINION IP bullet 4000i
- DINION IP bullet 5000
- DINION IP bullet 5000i
- DINION IP bullet 6000i
- FLEXIDOME IP 3000i
- FLEXIDOME IP 3000i IR
- FLEXIDOME IP 4000i
- FLEXIDOME IP 5000i
- FLEXIDOME IP indoor 8000i (– X series)
- FLEXIDOME IP starlight 5000i (IR)
- FLEXIDOME IP starlight 8000i
- FLEXIDOME IP starlight 8000i (– X series)
- MIC IP starlight 7000i
- MIC IP starlight 7100i
- MIC IP ultra 7100i
- MIC IP fusion 9000i

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3   Important notes:

3.1   *Two-factor authenticated firmware signature*

The security of the signature of the firmware file has been strengthened by using a two-factor authentication process for signing the final released firmware file. This new process has been prepared for with firmware 6.50 and comes into effect with succeeding versions.

The new signature protects from non-released versions being installed in production systems. As a result, pre-release (beta) versions, required sometimes in projects, need to have a special license installed prior to the firmware update. Requests for pre-release versions need to be handled via tech support tickets to allow tracking and require a concession signed by the customer.

In case a firmware must be downgraded from a device with firmware 6.51 or higher installed, the downgrade is only possible via firmware 6.50 with an updated signature. Please contact our customer service or technical support to get a link to this firmware.

3.2   *Firmware file encryption*

In order to upload version 6.51 or higher to a device running a firmware version below 6.50, you need to upgrade first to version 6.50, since older firmware versions do not support firmware file decryption. This can be achieved by uploading the combined firmware file multiple times until the required firmware version is installed.

3.3   *"Originally manufactured" certificate*

Since firmware version 6.30 all cameras are prepared to receive a unique Bosch certificate during production, assigned and enrolled by Escrypt LRA. These certificates prove that every device is an original Bosch-manufactured and untampered unit.
Escrypt is a Bosch-owned company, providing the Bosch certificate authority (CA).
Enrollment of the certificates in production is asynchronous to this firmware release.

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3.4 Secure Element ("TPM")

All CPP7.3 devices incorporate a secure microcontroller, which we call our Secure Element.
"A Secure Element is a tamper-resistant platform capable of securely hosting applications and their confidential and cryptographic data (for example cryptographic keys) in accordance with the rules and security requirements set by well-identified trusted authorities."[1] In this specific case the requirements are defined in the Trusted Platform Module library specification defined by the Trusted Computing Group (TCG). As the Secure Element supports the main functionalities specified by TCG, the ones needed for an IoT device, it is often referred to as a "TPM".
Due to security reasons, the firmware or functionality of the secure crypto-microcontroller cannot be altered in the field.
Thus, not all new security features become available on devices with older secure crypto-microcontroller hardware or firmware revisions.

3.5 Open-Source Software

Bosch Security Systems is an advocate of integrating open-source software into its products. The use of open-source software is noted in the *Service* menu on the *System Overview* page of every camera's web interface. For general information regarding open-source software in Bosch Security Systems products, please visit http://www.boschsecurity.com/oss.

3.6 NTCIP

Cameras prepared for Intelligent Traffic System (ITS) applications support NTCIP protocol, which was updated to meet NTCIP 1205 v01 AMENDMENT 1 in November 2020 as from firmware 7.72.0008 onwards. This update may break compatibility with outdated ITS software.

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[1] https://globalplatform.org/wp-content/uploads/2018/05/Introduction-to-Secure-Element-15May2018.pdf, page 1

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4   New Features

- Traditional Chinese language and characters have been added to the UI of the camera web page; however, this implementation does not include the language as an option for On-Screen Display (OSD).

5   Changes

- We've made some updates to the firmware infrastructure for object geolocation on moving cameras. Now, it delivers data even while the camera is panning or moving. It is not required anymore to be in a 3D tracking mode on a pre-position. Unlike before, the system now considers global calibration when the camera is not in its pre-positions, such as during intelligent tracking. The position accuracy decreases with object distance and PTZ movement, 3D tracking at a calibrated pre-position should be used for maximum accuracy. Due to an issue in Configuration Manager 7.71, a global calibration has to be repeated if a pre-position was calibrated.

- Default settings have been changed for the RCP+, HTTP, RTSP, RCP, SNMP, ISCSI, UNPN, and NTP ports. These will become effective with new cameras and by factory-defaulting a camera but will not be affected by upgrading firmware to avoid functional interrupts of existing installations. For detailed information on "Security by Default" please refer to our tech note at https://www.boschsecurity.com/xc/en/solutions/video-systems/data-security/#downloads .

- The issue with incorrectly displayed parameters of the bandwidth throttle settings on the web GUI has been resolved.

- Improved recorder initialization during device boot-up to ensure proper signalization and normal operation.

- Fixed issue where recording configuration based on VCA Event Trigger was not set after a camera reboot, resulting in recordings not starting.

- Fixed medium and high-level vulnerabilities in a third-party library.

- Changes were made to the architecture of recording communication to provide a more robust solution to our customers and reduce the likelihood of recording gaps in atypical circumstances.

- Fixed an issue that prevented some devices from displaying the dashboard while connected to the Remote Portal UI.

- Fixed issue where uploading a config file failed when the service password contained the character "%".

- Fixed a minor movement issue occurring after ending PTZ movement on the MIC IP fusion 9000i.

- General improvements in image quality have been achieved by applying new settings to the camera module configuration of the MIC IP Ultra 7100i, enabling the possibility of achieving a sharper image when properly configured by the user.

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- Fixed an issue where the Default/Top shutter limit drop-down was not being correctly represented in the GUI.
- The default values for the day/night near focus limit were adjusted to optimize behavior for a broader range of use cases. Following a firmware upgrade, cameras will maintain the set value without automatic alteration, with the default only applied if manually selected or visible in new devices.

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6   System Requirements

- Web Browsers:
    - o   Google Chrome
    - o   ~~Microsoft Internet Explorer 11 or higher~~
    - o   Microsoft Edge (Chromium based)
    - o   Mozilla Firefox
- DirectX 11
- MPEG-ActiveX 6.34 or newer (for IE only)
- Configuration Manager 7.62 or newer

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7   Restrictions; Known Issues

User Interface

- If UAC is set to default in Windows 7, no snapshot or recording via LIVEPAGE is possible.
- Video and audio may be asynchronous during replay via Web page.
- If a VCA configuration using a rule engine is switched to a VCA configuration without using a rule engine, e. g. MOTION+ or IVA default configuration, the saved configuration is invalid. Forensic search with this configuration may lead to undesired search results.
- In Firefox, no audio is audible on the Audio Settings page.
- Opera mini for mobile devices cannot work in Intranets because it gets all pages through an Opera proxy in the Internet. If there is no Internet connection no content is provided.
- When changing GUI language, the browser cache may have to be deleted and the web browser be reloaded before the language will be selected correctly.
- Google Chrome requires a plug-in for displaying TIFF images to properly show the reference image.
- Fluent decoding of buffered .mp4 video from camera is strongly dependent on the browser, Jerky video may occur, e. g. with Mozilla Firefox 52.0, which is not a camera malfunction.
- Shutter time values in preview window might slightly deviate from rounded values selectable from dropdown menu.
- Privacy masks and other orientation-related parameters must be checked and eventually re-assigned after rotating a camera.
- Exchanging the company and device logo might not be possible anymore due to strengthened web browser security features, although the settings are still possible in the web user interface.
- Firmware upload in recovery mode (app0) is very slow on products produced with FW 6.32 up to FW 6.5x. Be patient and don't interrupt the upload.
- On-screen display stamping
    - o Font size minimum is ensured for lower resolutions if per mill value would be too small.
    - o Font size is automatically limited when maximum display stamping capabilities are reached though values may indicate differently. Limitation is evenly distributed over all defined stamping sections.
- A defective SD card may show 'device ok' status while being unusable. Check recording status for high level error description.
- Microsoft Edge may request re-entering the login credentials multiple times after reactivating a sleeping tab.
- RTSP live stream via media stream library is not possible with Safari browser on iOS/iPad.
- Password length for 'service', 'user' and 'live' is limited to 19 characters. Password length for all other users defined in one of the user groups is limited to 31 characters.

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- Due to the recently introduced security feature 'HTTP referrer check' the browser connection will not be automatically redirected after an IP address change.

Encoding

- For H.264, only Main Profile using CABAC is supported. CAVLC is not supported.
- Frame rates in low light mode might vary and cause bit rate control to produce higher bit rates than set as maximum.
- With GOP structure set to IBP and IBBP the I-frame distance may not exactly correspond with the set value.
- For stream setting "Dual ROI" the maximum resolution of stream 2 might be limited regardless of a higher resolution selected in the encoder profile.
- Encoder quality regions are not implemented.
- For DINION IP bullet 3000i 5MP and FLEXIDOME IP 3000i 5MP series, using H.265 limits the maximum resolution to 4.2 MP. The maximum resolution of 5.3 MP can only be achieved with H.264 encoding.

Security

- When using certificates for mutual authentication, it must be ensured that the camera uses a solid and trusted time base. In case the time differs too much from the actual time, a client might be locked out. Then, only a factory default will recover access to the camera.
- Excessive signing, e. g. due to very short video authentication signing interval, may have an impact on TLS connection setup.
- Client authentication is not working using Microsoft Edge as the browser does not send any certificate for client authentication, so the camera has nothing to authenticate.
- Video authentication using SHA hashing mechanisms are not functional if no self-signed certificate has been created yet. Opening an HTTPS connection once is prerequisite.
- Creating 2048 bit keys for self-signed certificates may take more than 20 seconds, extending the initial boot cycle, which may occasionally cause a timeout on the very first HTTPS connection to a camera. The next connection attempt typically is successful.
- If software sealing is active and SNMP is disabled in Network -> Network Services, no SNMP trap will be sent out on seal break due to the disabled service. The seal break itself is logged.
- More complex ciphers require more processing time during connection handshake, slowing down the connection setup.

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Network

- QoS values are set according to group Video/Audio/Control for UDP packets, but for TCP packets, only the QoS value for Video is inserted.

  Note: Values are allowed to be entered as ToS values in increments of 4.
      To set a valid DSCP enter a (ToS) value between 32 and 224 as increments of 8.

- IP addresses 172.20.1.0/30 which include 172.20.1.0 to 172.20.1.3 are reserved for internal communication and must not be used as device addresses. Products without internal communication ignore this restriction and allow the use of this range.

- Multicast streaming must not be used in combination with bandwidth throttling or treated very carefully. The same is valid for any other bitrate-creating source or function inside the camera, e. g. recording or exports. It must be ensured that the average total bitrate created by the camera does not exceed the available and configured bandwidth, otherwise data may be lost, or the camera may behave unresponsive.

- When multicast streaming is used with encryption via RTSPS/SRTP, accessing the multicast stream unencrypted is no more possible as the same multicast group is used.

VCA

- Slow moving objects may not be detected. There is a minimum speed for objects to be detected as moving.

- On FLEXIDOME 5000i Essential Video Analytics is only running on prepositions, making Intelligent Auto Exposure non-functional outside of prepositions.

- Upgrading a MIC or AUTODOME, with VCA configured, to FW 7.70.126 will break the VCA configuration. It is recommended to upgrade to FW 7.72 or higher.
  If the VCA configuration has not been changed manually, an upgrade from FW 7.70.126 to FW 7.72 or higher is advised to restore configuration and functionality.

- "VCA configuration" user group and its assignment need to be configured and used in Configuration Manager 7.2 only

- IVA and flow need at least 12.5 frames per second video input frame rate. If IVA or Flow are configured, minimum frame rate of 12.5 must be set in ALC mode.

- There is only one configuration for IVA. When analysis type is changed, e. g. from IVA to IVA Flow, the former configuration is lost. Due to this, it is not possible to change the analysis type in a VCA profile switch.

- Due to a limitation of the script language that is used in the background, the delay timer for event-triggered VCA starts immediately when the configuration is set. A trigger event during this period does not restart the timer. Once the timer has elapsed, operation is as desired.

- On devices with VCA FPGA an outgoing IPv6 connection fails when device is initiator, e. g. trying to resolve a time server domain name,

- "Too dark" alarm is not triggered under normal conditions due to the cameras low-light capabilities.

- VCA shapes are not synchronized with video when using the open-source JavaScript library for decoding.

MOTION+

- An alarm recording configured to be triggered by MOTION+ with masks may not be operational after reboot. Saving MOTION+ configuration without any changes recovers from that. Alternatively, masks may not be used with MOTION+.

Recording

- LUN size for local recording via "Direct iSCSI" is limited to 2 TB.

- VRM version 2.12 or higher is required.

- In some cases, formatting errors on external iSCSI drives may occur, which might need multiple tries to overcome.

- In rare cases it may happen that the owner of an iSCSI LUN is not displayed correctly. Recording is not affected; just previous owner remains displayed.

- If a device had primary and secondary recording running on SD card and is then added to a VRM system, the blocks used for primary recording will not be re-used, reducing the available recording space for the ANR recording. This can be solved by re-formatting the SD card.

- SD card recording performance is highly dependent on the speed (class) and performance of the SD card.

- With I-frame-only recording and audio also enabled for recording, audio will be fragmented or not audible during replay. Please disable audio recording in case of I-frame-only recording.

- Numbering of the recorded files on the replay page is not always contiguous. If snippets across block borders belong together, like pre-alarm and alarm recording, the snippets become logically united and only the lower file number is presented in the list.

- SDXC cards are formatted to FAT32 file system and not using the exFAT file system as being mandatory for SDXC standard compliance but fully recognized and accessible. The maximum size of 2TB is also supported with FAT32, once SD cards of that size might become available. FAT32 also increases portability to other than Windows platforms.

- If a local media is exchanged, existing former recordings are only discovered after rebooting the device.

- Physically removing the local storage media while recording causes the device to reboot. Recording must be stopped before removal.

- Changing audio format while audio is being recorded may cause unknown behaviour of the device and must be avoided.

- 5MP and larger JPEG streaming via RTSP is only possible with decoders supporting the ONVIF extensions.

  JPEG streaming via RTSP is based on RFC 2435. This RFC only allows for a maximum JPEG size of 2048 by 2048.
  With ONVIF, the original, larger JPEG headers can also be transmitted via RTP header extensions. Unfortunately, this only works with decoders using these extensions, i. e. it does not work with a standard VLC.

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- After modifying account settings, e. g. FTP server address, to get the changes applied either switching posting off and on or restarting the device is required.
- The storage system indicator status must be ignored during formatting of an SD card.
- Forcing the camera into an overload situation may cause undesired behaviour and in worst cases even recording gaps. It should always be ensured that the CPU load is not consistently around or at its maximum. This can be achieved by adapting encoder settings or avoiding too many tasks, e. g. client sessions, in parallel.
- In FLEXIDOME IP 8000i SD cards 1 and 2 initial behaviour is different due to the first SD card being automatically added by the system and prepared for recording while the second SD card is treated like any other additional storage medium that must be manually added to the system before it can be used.
- In FLEXIDOME IP 8000i SD card failover mode is not supported in case of ANR. Both SD cards will be used with equal priority.

Export
- FTP exported files which include audio in a format other than AAC must be renamed from .mp4 to .m4a to allow correct playback in QuickTime.
- With JPEG Posting active when device is booting, the first posted JPEG image may be a no-cam logo.
- FTP posting with resolution 1080p delivers JPEG with size of 1920x1072 pixels due to 16 pixel macroblock boundary of the JPEG encoder.
- If FTP export files contain only a few frames some players might not correctly replay such a file, or the replay is too quick to recognize something. The exported file is not corrupt though it might seem so.
- Files exported using continuous FTP backup for Rec. 2 where stream 2 is set to I-frames only mode contain wrong timing information and play back too fast.
- FTP export file size is always 100 MB if resolution change occurred in exported time span.
- Getting the file list from Dropbox may fail if there are too many objects (files and folders). Limit is approximately higher than 500 objects but also dependent on file name length etc.
- Using "export from memory" with pre-alarm recording exceeding the available memory will cause continuous recording on the account storage. Checking the memory requirement of the pre-alarm ring is advised to avoid unexpected memory consumption.
- When recording to RAM and 'Export from memory' the recording status page may not show the correct recording status.

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Moving cameras

- Autopan starts outside of defined range if orientation is set to "Inverted".
- Tilt up limit is treated as lower tilt limit if orientation is set to "Inverted".
- In AUTODOMEs, blanked sector may trigger a "too dark" alarm.
- On AUTODOMEs, privacy masking does not cover the complete configured area if privacy mask is placed too close to the edge of a scene. Move the target position to the center of the scene before creating a privacy mask.
- If LIVEPAGE is refreshed during recording of Tour A/B on AUTODOMEs the button "Stop display" will falsely display "Start recording" but still continue tour recording.
- After a firmware upload it may happen that the Privacy Masks and settings from Installer Menu are set to default. Make sure to check if Privacy Masks and Installer Menu settings are still valid after uploading new firmware.
- For optimal image performance the user is advised not to turn off contrast enhancement during normal camera operation.
- To improve Recorded (Guard) tour playback accuracy, Bosch recommends users record tours using the User Interface (UI) instead of using a keyboard. In the event that the Recorded (Guard) tour loses position accuracy during playback, users should re-home the camera using the "Find home" button on the Live page.
- MIC 7000 orientation can be switched between normal and canted.
- When the user changes orientation from normal/canted to inverted (or vice versa), MIC 7000 will tilt itself up and over so that the visor and wiper are on top. If there is an attached illuminator this would result in the illuminator hitting the MIC's body. To avoid this, MIC 7000 will not allow an orientation change while the illuminator is attached. A warning message with "Yes/No" selection will be displayed when the user clicks the orientation radio button and the MIC has an illuminator.
- On AUTODOME 7000 and MIC 7000 "HDR" can be selected in the preposition mapping but has no effect as it is not supported in these models.
- NTCIP requires to have the SNMP port enabled to become functional. As the SNMP port, amongst others, has been closed by default if not needed due to security improvements, it must be re-enabled to allow NTCIP to work.
- Scene/VCA profile may not be correctly restored, causing the Sketch button to be disabled.
- On MIC IP ultra 7100i, the white balance sodium lamp levels have no function.
- On AUTODOME 7000i in inverted mode, fields in global VCA move into wrong direction.
- On MIC IP 7100i it may take an extended period of time before video starts streaming, both on upgrading to, and downgrading from this firmware version.
- Despite earlier mentions, AUTODOME starlight 7000i is only supported since FW 7.50.
- ONVIF GetStatus and GetPresets position data is incorrect.
- On MIC IP fusion 9000i, toggling the optical camera enhancement settings may sometimes affect the thermal camera settings.

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- For AUTODOME IP starlight 7000i, MIC IP starlight 7100i and MIC IP ultra 7100i, FW7.72 changed the process to set up Intelligent Tracking feature. For AutoTrack Auto to function with Global VCA, first the Global VCA must be configured to detect any object in the FoV. This was not, prior to FW7.72, a required step to use the Auto mode.
- On latest MIC 9000i with 9mm lens, metadata fusion might show misaligned shapes on the thermal image due to stronger lens distortion.
- MIC IP fusion 9000i may demonstrate a slight hesitation (approximately up to 5 seconds) prior to arrival at a preposition. This issue is under further analysis and improvement.

DIVAR hybrid / network
- Cameras running FW 6.4 or higher are only compatible with DIVAR network / hybrid FW 1.2.1 and higher. With earlier DIVAR network / hybrid firmware versions, the I-frame distance needs to be adapted to 30 or less.
- Cameras running FW 7.10 are only compatible with DIVAR network / hybrid FW 3.0.0 and higher. Compatibility with earlier DIVAR network / hybrid firmware can be obtained by re-enabling basic authentication or by using HTTPS.
- Connections to cameras running FW 7.50 and higher and using 2048 bit asymmetric keys may run into timeout due to the long key generation time for the multiple parallel TLS connections by the DIVAR network/hybrid.

ONVIF conformance
- When using GetPresets command preposition names are not set for scene1 to scene6.

Miscellaneous
- Before upgrading firmware it is best practice to back-up all configurations first, incl. IVA and calibration.
- After reboot, the system time re-synchronisation may be delayed up to 9 seconds for SNTP respectively up to 14 seconds for time server protocol.
- AAC audio timestamps for UDP live video streams as well as for recording streams are based on 90 kHz instead of 16 kHz to ensure compatibility with Video SDK.
  AAC audio timestamps for TCP live video streams are based on the standard 16 kHz timestamps. Standard players should connect to live video with AAC audio using TCP.
- After changing the selectable camera mode via alarm input the switch back to a previous mode doesn't work anymore.
- Firmware upload stops recording when it fails or is terminated.
- After downgrade configuration integrity cannot be ensured and settings need to be checked or re-configured. Sometimes even a factory default might be required, which is anyway recommended after a firmware downgrade.
- When a configuration file is loaded to an incompatible camera, e. g. a configuration file from a HD camera loaded onto a VGA camera, encoder settings might become invalid and need to be re-configured.

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- Uploading a configuration file from a different camera platform may result in unpredictable behaviour.
- If it shall be checked if the image is not frozen, use milliseconds timestamp to verify.
- Intelligent Defog default is OFF under "Low bitrate" scene mode.
- When combining CPU-intensive functions like e. g. encryption, watermarking, or dual recording, with high quality and high frame rate encoder settings, tuning of encoder profile settings might be required to avoid overload situations.
- No time change is allowed during the time when the "hour is repeated".
- Maintenance log file creation and download requires some time, though there is no progress indication, and needs to be waited for completion.
- Millisecond stamping on 60 fps cameras is refreshed with 30 Hz only, updating only every second frame.
- JPEGs with VCA overlay are not fully synchronized. Shapes might be slightly off.
- Audio back-channel in Chrome browser may be delayed when using an unsecure or unaccepted HTTPS certificate.
- RCP commands CONF_DATE_MONTH, CONF_DATE_DAY and CONF_DATE_YEAR can be read as P_STRING or as T_OCTET (year as T_WORD) but can only be written as T_OCTET (T_WORD for year), not as P_STRING.
- When using the GetVideoEncoderConfiguration command to fetch encoder configurations with known tokens, the system response will uniformly indicate either H.264 or H.265 encoding. This occurs independent of potential variations in configurations among streams.

Please check the respective release notes of a camera for further device-specific restrictions.

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8   Previous Revisions

8.1   New Feature with 7.89.0030

- The date format for display stamping is enhanced to allow also French date format.

- The enhanced settings for bandwidth throttling now allow better adaptation to the network's transmission and buffering capabilities.

- We've introduced an enhanced feature for camera naming. For CPP7.3 cameras, the firmware is ready to receive up to 6 different lines, each containing 31 characters. However, many clients, like VMSs or Cloud services, only have one field for configuring camera names in their UI, limiting our customers to utilize only one of the lines available on the firmware of our cameras when configuring via their clients.

  With the recent change, clients that only offer one field for camera names in their UI are now allowed to input up to 64 characters in their single-line camera name fields, instead of 31 as previously.

  The firmware enhancements will distribute the longer names across multiple lines, optimizing display within the constraints of a one-line user interface. The camera names displayed by our cameras will continue to contain 31 characters. This change should not affect integration with existing UIs; no additional configuration is required.

- The certificates web page now also shows the hash algorithm used on certificates.

- A 'video loss' error is introduced for internal fault situations that disrupt valid video throughout the processing chain.

8.2   Changes with 7.89.0030

- An issue in which the camera stopped recording during a security scan was identified and fixed with this release.

- As best practice to reduce potential attack surfaces and limit the exposure of sensitive services we are changing the default behavior of the cameras by disabling the initial configuration of NTP server port.

- As best practice to increase the default security, alarm task scripts using HTTP commands will now default to use HTTPS. Connections to unsecure devices need to explicitly address '*Port(HTTP)*' and set '*SSL(false)*'. Scripts are not automatically converted and may need to be enhanced.

- We have successfully addressed multiple vulnerabilities identified in the libraries used within our firmware. While additional protective measures are in place, we strongly encourage users to upgrade to the latest firmware.

- An issue with occasionally empty ONVIF tags is fixed.

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- An issue with ONVIF command GetAudioEncoderConfigurationOptions is fixed.

- SNMP trap list has been cleaned up from unused traps and enhanced by a power supply trap on applicable cameras.

- An issue with night/day switch-over on FLEXIDOME IP starlight 8000i is fixed.

- A focus issue on AUTODOME IP starlight 5100i is fixed.

- An issue with image flickering in factory default state on AUTODOME IP starlight 5100i is fixed.

- This release resolves a multicast streaming issue causing camera disconnections and live video interruptions, notably during sequential or rotational presentation of multiple cameras by VMS or other systems.

- An issue with web pages sporadically loading slowly is fixed.

- Addressed an issue related to the EAP-TLS authentication process. Previously, the camera transmitted an inaccurate "Cipher Suite" list via the client message, leading to potential confusion regarding supported cypher suites for specific firmware versions.

8.3 Changes with 7.87.0034

- An issue was fixed with 'Playback Tours' and 'Preposition Tours' when used with Intelligent Tracker, where the camera would not complete the tour playback when Intelligent Tracker was set to 'Auto'.

8.4 New Features with 7.87.0029

- Support of new FLEXIDOME IP 3000i IR cameras added.

- A banner has been introduced which allows to provide a system use notification to a user before authenticating.

- A switch has been added to directly activate or deactivate VCA without requiring the configuration plug-in.

8.5 Changes with 7.87.0029

- Applicable for: AUTODOME IP starlight 7000i and MIC IP fusion 9000i
    - o Improved Focus algorithm when moving to prepositions. This is most applicable to difficult scenes, such as low light/low contrast conditions.
    - o The default AE response speed was changed from Medium to Fast. This improves the AE and focus response time when moving from dark to light and light to dark

prepositions at night. This is most applicable when the camera is forced to remain in Color in low-light conditions.

- o A new camera block FW is integrated into the System Controller. This FW provides improvements in the image performance and focus reliability and response time.

- o Added the capability to set the Near Limit to "infinity". When the Near Limit slider is set exactly to the maximum of 20m, then the Near Limit is now saved as infinity.

- Applicable for: AUTODOME IP starlight 7000i, MIC IP starlight 7000i, MIC IP ultra 7100i, and MIC IP fusion 9000i

  - o A 5 second delay is automatically added at the end of the playback guard tour after the tour recording is stopped. This improved the focus response time when moving from a normal scene to a challenging scene, such as from good lighting to low lighting conditions.

  - o An issue is fixed where the record/playback guard tour did not always stop at the correct position at the end of the tour. This occurred most often with Tour B.

  - o An issue is fixed with Intelligent Tracking, where the camera could randomly fail to stop moving after a target is lost.

  - o Added support for BiCom Object 0x11.0 Operation (0x86)/MoveContVarFinSpeed. This is beneficial for 3rd party system integration.

  - o An issue is fixed where CONF_ALARM_OVERVIEW did not return proper state flags for VCA external simple states.

- The default day/night near focus limit was changed to 3m for the outdoor models. This improves the focus response time during, slow manual movements, Auto-Pan 360, and Auto-Pan between limits.

- An issue is fixed where the iris default values were not correctly recovered when switching from manual iris to auto iris mode.

- An issue is fixed for AUTODOME IP starlight 5000i where home position coordinates were not stored correctly.

- An issue is fixed where the audio recording format was disabled and could not be changed after recording was stopped.

- An issue is fixed where the web interface was lacking responsiveness when HTTP was deactivated.

- An issue, apparent in FW 7.81 and higher, is fixed where video via RTSP over TCP sporadically appears black after recovering from a network interruption.

- An issue is fixed where a camera could be driven into constant overload due to non-closed connections, requiring a restart to recover.

- An issue is fixed where necessary network settings were set to default on application variant switching. This includes the hostname setting as well as the Remote Portal credentials.

- Improved overall security by updating 3rd party components due to regular security maintenance.

- Some legacy RCP+ commands received a higher authentication level to further reduce the attack surface and improve security by default.

8.6 New Features with 7.86.0019

- The video.mp4 URL now accepts parameters to stream using RTSP, and also to access stream 2.
- The RCP command CONF_ALARM_OVERVIEW now includes recording errors and SD card mounting states.

8.7 Changes with 7.86.0019

- An issue with manual iris or focus control via ONVIF is fixed.
- An issue with certain VCA events erroneously reporting 'signal loss' via ONVIF is fixed.
- An issue with reverted iris control on AUTODOME IP starlight 5100i (IR), affecting image quality, is fixed.
- An issue where an AUTODOME IP starlight 5100i (IR) might have stuck in night mode is fixed by changing the underlying behavior of the day-night switch slider:
    - Night-to-day switchover positions higher than the default value will have an increasing wait period before switching from night mode back to day mode to prevent too early switching and oscillations.
    - Night-to-day switchover positions also require a higher light level to switch than before to prevent too early switching as well.
- An issue with wrong compass direction in inverted mode is fixed.
- An issue with AUTODOME IP starlight 5000i (IR) and AUTODOME IP starlight 5100i (IR), where zoom value via ONVIF Absolute Positioning command was incorrect, is fixed.
- An issue is fixed where after updating an AUTODOME IP starlight 5100i (IR) from firmware 7.60 to 7.85 PTZ was only working after rebooting the camera twice.
- An issue is fixed where the virtual mask configuration on moving cameras was not closed when switching from configuration to live, rendering the virtual masks solid.
- An issue with MIC cameras, using the serial port (under license) with Pelco D protocol, where nothing was responded back to serial port, is fixed.
- An issue, introduced with firmware 7.85, where putting the camera in corridor mode caused continuous reboots, is fixed.
- An issue is fixed where the calibration pane is twisted on a DINION IP 3000i when put in corridor mode, hindering VCA to detect objects.

- Multiple vulnerabilities in 3rd party libraries that were identified during UL 2900-3-2 certification are fixed.

- An issue is fixed where 802.1x authentication failed when EAP-PEAP is requested prior to EAP-TLS.

- An issue is fixed where necessary network settings were set to default on application variant switching, now including hostname and unit name.

8.8 New Features with 7.85.0016

- Cipher suites have been extended to provide higher security by adding the following ciphers:
  - TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256
  - TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384
  - TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256
  - TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384
- DNS resolution has been extended to also cover URLs in FTP accounts.

- On cameras with value level 7000 and higher, Camera Trainer is now enabled without requiring a license.

8.9 Changes with 7.85.0016

- An issue is fixed where the video stream is interrupted when an encoder profile is changed, e. g. due to adaptation for event recording by a DIVAR hybrid or network.

- PTZ latency of AUTODOME IP starlight 5100i and AUTODOME IP starlight 5100i IR has been improved.

- An issue is fixed where the thermal picture settings in a MIC IP fusion 9000i were lost during a reboot.

- An issue is fixed where the encoder streams configuration via ONVIF on FLEXIDOME IP 8000i with sensor resolutions above HD was not possible to utilize independent frame rate configuration when only 1080p resolution was required for stream 1 and stream 2.

- An issue is fixed where a MIC IP starlight 7100i does not move back to the correct Absolute Position when using ONVIF GetStatus and then manually moving away from the position.

- A rounding issue is fixed where a relative move via ONVIF showed different distance travelled for tilting the camera up versus down.

- An issue is fixed by a better description in the web user interface that a certificate signing request requires the country code instead of the country name.

- An issue is fixed in the ONVIF metadata translation where latitude and longitude values were swapped.

- The following issues are fixed for MIC IP 7000i and MIC IP 9000i that occurred after a heartbeat recovery is completed (camera briefly displays status 23):
  - o The camera ignored the zoom value of the preposition and always returned to a zoom factor of 1X.
  - o The camera ignored customer setting for night mode and always returned to AUTO.
  - o If an Inactivity Timer was in use, the selected function did not activate after the time period expired.
- An issue is fixed for all CPP7.3 moving cameras where 'AUX 50 Off' did not disable the in-activity timer.

8.10 New Features with 7.84.0023

- Bandwidth throttling has been added to allow the camera being installed on networks with limited throughput capacity. This allows a single video stream to adapt to a limited network, avoiding temporary overload of the transmission equipment due to transmission bursts. The available bandwidth can be configured as kbps values in the Ethernet section of the Network Access menu. The camera will then limit its data generation on the network to this maximum Ethernet transmission value to avoid bursts in the network traffic. The Ethernet input on the camera is not limited.
- The Network Access menu has been separated for IPv4 and IPv6 addresses. IPv4 and IPv6 can now separately be configured and activated.
- IP filter entries have been extended to allow up to 20 IP addresses or ranges.
- For certificate-based network authentication, and in case of an unsubstantiated time base, the camera may assume its time from the overlapping validity periods in the EAP-TLS certificates, if this feature is enabled via the camera's settings.
  With valid certificates, this will allow the camera to connect to the network even in case of an invalid system time due to e. g. a longer power loss.

8.11 Changes with 7.84.0023

- An issue is fixed where insufficient memory allocation caused sporadic unresponsiveness of a camera's web user interface.
- An issue is fixed where a wrong color was applied to alarm-triggered bounding boxes when using Camera Trainer.
- An issue is fixed where metadata from optical and thermal sensors were misaligned for video fusion in MIC 9000i.
- An issue is fixed for MIC-7000i & MIC-9000i where a heartbeat recovery occurred when the camera displays status 23. Prior to this FW there could be a random loss of PTZ control after the recovery was completed.

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8.12 Changes with 7.83.0027

- DNS resolution is now also supported for the ONVIF Profile M Event Broker URL.
- Panning a moving camera 180 degrees without changing tilt and zoom is now possible with a single command.
- An issue is fixed for MIC IP starlight 7100i (1080p) where IVA line crossing counting randomly stopped.
- An issue is fixed where black video was randomly and/or temporarily shown on MIC IP ultra after firmware upgrade.
- An issue is fixed where Camera Trainer showed a wrong class number.
- Support of 32 VCA profiles in moving cameras is now correctly reported in ONVIF.
- A communication issue between MIC 7000i and VIDEOJET connect 7000 is fixed.
- An issue is fixed where a certificate-based user could not be created via the web interface.

8.13 New Features with 7.82.0025 / 7.82.0026

- Support of VCA profiles has been extended to 32, providing more flexibility in assignment to PTZ prepositions and allowing coverage of 360 degree view with 32 sectors, even for zoomed-in thermal camera.
  Due to this extension and a 4 bit limit for the profile number in the metadata stream, metadata searches are now restricted to 14 individual profiles only, as profile number 15 is reserved for marking 'extended profile' in use.
- With the special 'extended basemode' license installed, it is now possible to select the cropped resolution1280x960 for stream 2. It is also possible to select the encoder source when using CGI parameter 'JpegSourceEncoder' to retrieve a snap.jpg of a cropped resolution stream from the camera.
- Firmware version 7.81 introduced an additional check on the HTTP referrer, an improvement to reduce the vulnerability for Cross Site Request Forgery (CSRF) attacks. For backward compatibility with legacy clients, applicable where alternative measures are put in place, this check can be disabled via the user interface.
- For TLS usage and 802.1x certificate verification, SHA384 hashing is now supported.
- For 802.1x, server certificate verification can be disabled, when a specific global license is installed. A server certificate is then no more required or will not be considered if installed. The license key to disable the server certificate verification is:
  - 12-01.48.01-3C683BD3-54B029FA-7E5ADCC5-6F29CD7F-55B0528E

  The license key to enable the server certificate verification is:
  - 12-01.48.00-EE2A44C1-EE5CC9E0-0BB6FBBD-2B582636-2CBBB1FC

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8.14 Changes with 7.82.0026

- In FLEXIDOME IP 5000i, auto-focus has been improved to better adapt to lens characteristics.

8.15 Changes with 7.82.0025

- An issue, introduced with FW 7.81, where the ONVIF command GetEventProperties did not show the old IVA events nor the new RuleEngine events anymore, is fixed.
  With FW 7.82 it will show the configured RuleEngine events.
  A proper implementation should use the ONVIF commands GetRules and GetSupportedRules for a comprehensive rule presentation.

- An issue with internal adaptation of the iSCSI MSS when the MTU value is changed is fixed.

- An issue with thermal settings lost when changing parameters on the visual line is fixed.

- An issue where the camera did not receive an IP address via DHCP after 802.1x authentication is completed is fixed.

- An issue where MIC 9000 sporadically showed no thermal video after reboot is fixed.

- An issue with increased response time for ONVIF Profile M event handling via MQTT is fixed.

- Due to a change in the Dropbox API, the support for Dropbox will be deprecated.
  We are working on providing an alternative, which will be announced with a future firmware version.

8.16 New Features with 7.81.0060

- Support of the new indoor FLEXIDOME 8000i variants: FLEXIDOME IP indoor 8000i.

- New P-iris supported on FLEXIDOME IP starlight 8000i.

- Support of ONVIF Profile M, including MQTT event forwarding.

- China standard GB/T 28181 has been put under a global license. When GB/T 28181 shall not be available it can be disabled with a global license key. This is irreversible for customers and can only be reversed via service and repair. The license also prohibits downgrading to earlier versions which provided GB/T 28181 as standard feature.
  License key to disable GB/T 28181 is:
  - 22-01.47.01-BF365391-21ABCB3D-28699CE4-3BD3AB09-FE25CD61

- New Western Digital industrial SD cards with lifespan monitoring are supported.

- Privacy masks can be enabled and disabled via a single switch command.

- Audio alarm menu has been enhanced to allow shaping for certain audio occurrences.

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- o   Alarm thresholds are separated per frequency band.
- o   Sensitivity can also be set separately per frequency band, if required.
- Dashboard and dashboard export have been enhanced by iSCSI information and various other settings.
- Flexible person shape can be selected in 3D tracking.

8.17 Changes with 7.81.0060

- Network authentication via 802.1x starts only after synchronization with time server, or after timeout falls back to internal time base. Authentication attempt without valid time is prohibited.
- Selection of audio encoding (G.711, L16, AAC) and AAC modes (48 kbps, 80 kbps) are now separated. Indication is given that AAC 80 kbps is not functional with the livepage via RTSP.
- SNMP MIB has been extended by manufacturer name and serial number.
- Encoder streaming base mode names are auto-generated from the configured resolutions.
- An issue with absolute position, reversed tilt movement, and incorrect pan coordinates via ONVIF is fixed.
- An issue where alarm message text was not written to the correct metadata layer is fixed.
- An issue where custom gain values were lost when switching between scene modes is fixed.
- An issue with IVA events not being forwarded via ONVIF is fixed.
- An issue with privacy mask "Auto" always being grey is fixed.
- An issue with blurry stamping on the thermal image of MIC IP 9000i is fixed.

During a penetration test, Kaspersky Lab, who was contracted by Bosch for IP camera security maturity certification, detected a vulnerability which required immediate action to ensure the security of installations using our cameras.

For more details refer to our Security Advisory BOSCH-SA-033305-BT, published at our Security Advisory web page
https://www.boschsecurity.com/xc/en/support/product-security/security-advisories.html
or visit our PSIRT website at https://psirt.bosch.com.

- An issue which provided a possibility to conduct a CSRF (Cross Site Request Forgery) attack is fixed (CVE-2021-23848).

8.18 Changes with 7.80.0129

During a penetration test, Kaspersky Lab, who was contracted by Bosch for IP camera security maturity certification, detected some vulnerabilities which required immediate actions to ensure the security of installations using our cameras.

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For more details refer to our Security Advisory BOSCH-SA-478243-BT, published at our Security Advisory web page
https://www.boschsecurity.com/xc/en/support/product-security/security-advisories.html
or visit our PSIRT website at https://psirt.bosch.com.

- An issue with unauthenticated information extraction is fixed (CVE-2021-23847) (already fixed in 7.80.0128).

- An issue with reflected XSS in URL handler is fixed (CVE-2021-23848).

- An issue with denial of service due to invalid web parameter is fixed (CVE-2021-23852).

- An issue with improper input validation of HTTP header is fixed (CVE-2021-23853).

- An issue with reflected XSS in page parameter is fixed (CVE-2021-23854).

8.19 Changes with 7.80.0128

- An important fix was made to improve the overall security of the firmware.

8.20 New Features with 7.80.0127

- Support of new IR cameras in AUTODOME IP 5100i family.

- Support of new X series cameras in FLEXIDOME IP 8000i family.

- Extended number of resolutions and frame rate combinations for FLEXIDOME IP 8000i family.

- On-screen display stamping has been reworked to allow more flexibility.
  - Font size can be defined per stamping section, resolution-independent by per mill of screen size.
    Font size will automatically be limited to the possible maximum size, evenly distributed over all stamping sections.
  - Text and background colours can be defined per stamping section.

- Temperature and humidity levels can be queried via SNMP from applicable cameras.

- Following camera block firmware updates are incorporated.
  Refer to Knowledge Base for camera block firmware upgrade instructions
  (keyword search – "camera block performance").
  - AUTODOME IP starlight 7000i received new camera block firmware for video optimization.
  - MIC IP starlight 7100i kept same camera block firmware as FW 7.72.
  - MIC IP starlight 7000i, MIC IP fusion 9000i (per S/N range listed in the upgrade instructions) received new camera block firmware for focus optimization

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8.21 Changes with 7.80.0127

- Usability improvements
  - Reboot request info is displayed when a license has been installed.
  - In case a Remote Portal user's login credentials are associated with multiple company accounts in Bosch Remote Portal, a message will be displayed in order to make sure that a "default commissioning company" will be defined. Otherwise a successful registration will be prevented.
- Moving Cameras
  - ONVIF Configuration push/focus mode change no longer changes the Max Gain value.
  - ONVIF Absolute Position improved to avoid overshooting and/or losing a target.
  - ~~An issue is fixed where the pan polarity from positioning via ONVIF was reversed.~~
- AUTODOME IP starlight 7000i, MIC IP starlight 7100i and MIC IP ultra 7100i
  - Fixed FW7.72 IVA rule set with a preposition failed to trigger Intelligent Tracker when set to Auto mode.
- An issue is fixed where MSS and MTU settings may have come out of sync. During a write to the MTU size, the MSS is now checked and, if fragmentation would occur, would implicitly be adjusted to a value of MTU-40, before the MTU is reduced.

8.22 Changes with 7.72.0008

- An issue was fixed where pan angle sign was inverted, causing video analytics elements to be placed at wrong positions.
- AUTODOME IP starlight 7000i, MIC IP starlight 7100i and MIC IP ultra 7100i
  - Implemented NTCIP auto focus and auto iris mode control.
  - Implemented NTCIP wiper control (MIC).
- AUTODOME IP starlight 7000i, MIC IP starlight 7100i
  - New camera block firmware for video optimization.
    Refer to KB for camera block firmware update instructions

Note:
Upgrading a MIC or AUTODOME, with VCA configured, to FW 7.70.126 will break the VCA configuration. It is recommended to upgrade to this FW 7.72.
If the VCA configuration has not been changed manually, an upgrade from FW 7.70.126 to this FW 7.72 is advised to restore configuration and functionality.

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8.23 New Features with 7.70.0126

Remote Portal

- Remote Portal registration has moved from advanced network settings to the new Cloud services section within the new Connectivity top menu
- Faster access to Remote Portal after device registration via "Visit Remote Portal" link
- Polished Remote Portal registration menu
- DNS/gateway check introduced to static IP addresses

VCA

- New (fourth) user group for "VCA configuration" introduced
    - o this user group has the privilege to just configure VCA
    - o it is possible to assign a user (created by the system integrator) to the new user group "VCA configuration"
    - o Configuration Manager 7.20 is to be used only

ONVIF

- Increased resolution of absolute position coordinates

Network

- IPv6 Multicast support for RTSP and SRTP
- Accounts, DynDNS, and Cloud services were moved to the new Connectivity top menu

Miscellaneous

- Support of new camera FLEXIDOME IP starlight 5000i (IR)
- Updated icon design in web interface
- Interfaces menu was integrated into Alarm menu
- Possibility to integrate milliseconds into JPEG filenames
- RCP+ documentation extended by Common Product Platform (CPP) support on command level
- Gain control can be de- (activated)
- HTML5 based PTZ control in browser

8.24 Changes with 7.70.0126

Miscellaneous

- New encoder base modes

Moving cameras

- MIC IP 7000i/9000i – maximum gain selection now possible using a slider
- Fixed gain selectable via dB gain dropdown
- MIC IP - Pan offset store/clear options (store causes the pan position to start counting from 0, clear restores the pan position to original value)

Fixes issues regarding

- PTZ functionality in 7.61
- Display of IVA rules in BVMS Configuration Client
- Access to reference image stream in BVMS
- IP Camera not able to write to iSCSI when SD card failed
- inaccessible recording when special character "%" was part of password
- periodic brightness alternation (fixed since 7.61)
- RTSP streaming not working when HTTP is disabled

8.25 Changes with 7.62.0003

Fixes issue that affects all CPP7.3 cameras, produced with firmware version 7.60 or 7.61, where firmware upload in recovery mode (app0) is not possible.

8.26 Changes with 7.61.0026

Missing documentation was added.

8.27 Changes with 7.61.0023

- An issue with UDP multicast no longer working after upgrade to FW 7.60 is fixed.
- An issue is fixed where high-frequent motion recording with 10 seconds pre-alarm in RAM may stop sporadically.
- An issue, introduced with FW 7.60, is fixed where ANR was only doing alarm recording though being configured for continuous recording.

8.28 New Features with 7.60.0118

Moving cameras

- For MIC IP starlight 7100i, MIC IP ultra 7100i, MIC IP starlight 7000i, MIC IP fusion 9000i, AUTODOME IP starlight 7000i, AUTODOME IP 5000i, AUTODOME IP 5000i IR, AUTODOME IP starlight 5000i, and AUTODOME IP starlight 5000i IR, AUTODOME IP 4000i, an Alternate Home Position can now be defined.
- GPS Assisted Tracking has been added to MIC IP starlight 7100i, MIC IP ultra 7100i, MIC IP fusion 9000i and MIC IP starlight 7000i.
- For MIC IP starlight 7100i, MIC IP starlight 7000i, MIC IP fusion 9000i and AUTODOME IP starlight 7000i and AUTODOME IP starlight 7000 HD, a Gamma correction slider has been added, which allows to adjust the Gamma scheme to get more detail in dark area, or to get video with more contrast.

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- Black line correction, which often increases the sharpness but it may introduce the edges of objects as side effect, is now available as configurable setting for MIC IP starlight 7100i and AUTODOME IP starlight 7000i.
- For AUTODOME IP starlight 5000i (IR), Intelligent Defog has been enhanced to now three states: Off, Auto and Extreme.

VCA

- In web browsers that do not support MPEG-ActiveX, VCA configuration is only possible via Configuration Manager. An info message to use Configuration Manager is presented, with a hint where to get Configuration Manager if it is not installed.
- Object filters 'height' and 'width', which are more intuitive than 'area' and 'aspect ratio', have been added.
- Metadata can be filtered to exclude certain not required content. This may help especially on low-bandwidth links, or to reduce load on successive algorithms and services.
- A new, more flexible aggregation time mechanism has been added to the rule engine script. This mechanism supersedes the old aggregation time setting (RCP command), which is applied after the rule engine globally. For backward compatibility, existing use of old aggregation time is kept on firmware update, otherwise removed from user interface.
- Gyro sensor, if available, has been added as option for camera tamper detection.

Miscellaneous

- The RTSPS service has been added to the Network Services page.
- Firmware upload is now possible via ONVIF.
- For Stratocast cloud access, the global motion/VCA alarm is forwarded via Stratocast protocol when VCA is activated, automatically creating a 'detect any object' rule.
- For Stratocast cloud access, Intelligent Streaming is now automatically activated.

8.29 Changes with 7.60.0118

- Due to switching from basic authentication to digest authentication only with the previous firmware release FW 7.50, backward compatibility was lost with devices in the field that only accept basic authentication, putting installed systems out of function.
To solve this, the authentication method can be specified via a parameter for outgoing connections in Alarm Task Scripting. Refer to the updated ATSL manual.
- FLEXIDOME IP 4000i / 5000i cameras have received a hardware update as these cameras now use different lenses with the same characteristics. These new variants are supported from FW7.60 onwards and cannot be downgraded to earlier versions.
- Audio alarm has been assigned with a default name.
- An issue is fixed where recording span events were reported as errors while being normal operational events.
- An issue of the revoked build 116, which could have caused recording to not restart after reboot, is fixed.

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Note:

Due to the changes in the recording engine, recording encryption is no more compatible with released VRM versions, and thus recording encryption must not be enabled. Otherwise, encrypted recordings will not be retrievable anymore until upgrading to a new VRM version.

8.30 New Features with 7.50.0079

- Support of new products MIC IP starlight 7100i and MIC IP ultra 7100i.
- Latency of live video, when no MPEG-Active-X is used, has been reduced by using an open source JavaScript library.
- Alarm Task Scripting Language (ATSL) has been enhanced to allow a free username that can be used with sending an HTTP POST command to e.g. control an I/O device.
- Connection establishment over RTSP with parameter "vcd=3" provides an XML stream with extension tag where the original RTP VCD data packet is encapsulated with base64 encoding. This allows for the possibility to send ONVIF and VCD data in one stream.
- An alarm message can be created if time synchronization fails, and an SNMP trap can be sent.
- Text overlay colors (background and foreground) can be selected out of the standard color palette.

8.31 Changes with 7.50.0079

- The menu item "Image posting" has been moved within the sidebar menu into the "Recording" section. A link to configure accounts has been added.
- The special character '+' is not allowed in passwords anymore as it conflicts with some authentication methods.
- ONVIF AbsoluteMove command now allows the optional parameter "speed" for pan and tilt movements.
- ATSL commands now use HTTP digest authentication. Basic authentication is disabled.
- Face Detector has been improved.
- The basemode "D1 crop" is changed from 704x480/576 to 720x480/576 pixels.
- The number of possible sectors on moving cameras has been enhanced by 6 and 9.
- On 5 MP cameras, large font support is disabled due to memory limitations.

8.32 New Features with 7.10.0074

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- A dashboard, available under service permissions, provides a compact but extensive view on parameters that might be especially helpful for troubleshooting.
  An export function provides even more details than displayed on the dashboard page.

- Intelligent Streaming has been enhanced by a "Dynamic sharpness and noise filtering" option, which uses information from the encoder to optimize the image processing according to the encoder requirements. An additional bitrate reduction of up to 25% can be achieved.

- Scene mode names in fixed cameras have been adapted to reflect their intended use cases better and synchronized between fixed and moving cameras. Scene modes settings have been tuned accordingly to better match their intended applications.

- IP address can now be changed dynamically during runtime, not requiring a reboot cycle anymore. This allows for quarantine network transition on 802.1x network configurations as well as for dynamic IP address assignment from DHCP.

- Support of China GB/T 28181 has been updated to comply with 2016 standard.

- AES encryption on RTP connections is now possible, allowing encrypted UDP multicast connections in a BVMS setup.

- Default value for TLS has been set to version 1.2 to increase security by default.
  This may cause incompatibility with older client applications.

- Session cookie has been secured by default, disallowing authentication forwarding to MPEG ActiveX and other applications, like replay via Video Security Client. Re-authentication is required for these applications when called out of the web browser despite an already authenticated browser session.

- An option to export from RAM recording buffer allows recording exports on the fly without requiring an SD card or external iSCSI storage.

- A separate hostname setting is introduced. For backward compatibility, the hostname setting is still pre-filled from entries in the camera and unit name fields but can then be configured independently.

- Multicast connections for audio streams are now supported.

- An auto back-focus command is introduced to initiate an auto back-focus adjustment cycle without the need for entering the Lens Wizard.

- The alarm rule output options on MIC are enhanced by AUX 68 "White Light ON".

- Display stamping logo size is increased to 300 by 300 pixels.

- On MIC IP starlight 7000i and MIC IP fusion 9000i, an overlay is introduced to mark landmarks in the picture.

- The thermal line of a MIC IP fusion 9000i can now be calibrated.

8.33 Changes with 7.10.0074

- An issue is fixed where too small pre-alarm recording buffers caused sporadic error messages.

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- An issue is fixed where sporadically a wrong Ethernet link mode was detected.
- An issue is fixed where empty connections could be established using an obsolete URL.
- An issue is fixed where sequence numbers in metadata RTP streams were wrong after VCA was reconfigured.
- An issue is fixed where no folder could be added to a Dropbox account.
- An issue is fixed where device could not be registered in Remote Portal anymore.
- HTTP digest authentication is set as default.
- iSCSI MSS setting has been removed.

8.34 New Features with 6.61.0025

- Support of new FLEXIDOME IP starlight 8000i family.
- A licence is introduced to permanently disable the Wireless LAN interface of a FLEXIDOME IP starlight 8000i camera.
  To activate the license enter the following license code:
    o 12-01.6B.01-CF47F87B-B082146B-D79F9999-C40ED3E9-0E31AA55
  Note: Recovering the WLAN interface requires sending the camera to a Bosch service center.

8.35 Changes with 6.61.0025

- An issue is fixed where the pan polarity from positioning via ONVIF was reversed.
- An issue is fixed where VCA counters were reset when VCA editing was started.
- An issue with a broken certificate chain in the "originally Bosch manufactured" certificate used for HTTPS by default has been fixed. Corrupt certificates will be repaired.

8.36 New Features with 6.60.0065

Security
- Software sealing is extended to cover more static parameters of image pre-processing and moving camera control.
- Manual and automatic logout functionality added to the web browser interface:
    o A "Logout" button is available in the blue navigation bar between "Links" and help icon.
    o A timeout in minutes for the browser session can be defined via the Web Interface -> 'Live' functions menu.
- Enhancements for Alarm Task Scripting:

- o A seal break event can be used to trigger alarm task scripts.
- o An SD card lifespan alarm can be used to trigger alarm task scripts.
- Enhancements for SNMP:
  - o A seal break event can trigger an SNMP trap.
  - o An SD card lifespan alarm can trigger an SNMP trap.
  - o An event from the Embedded Login Firewall can trigger an SNMP trap.

Moving cameras

- A "snap to area" function is added to allow selection of a new image area that the camera zooms to. The rectangle to define the area can be drawn over the video by holding "CTRL".
- Inactivity period selection for moving cameras is extended up to 24 hours.
- Number of privacy masks on MIC 7000 and MIC 9000 increased from 24 to 32.

ONVIF

- Signalling of 'idle object' is added to the ONVIF metadata stream.

Miscellaneous

- Genetec Stratocast cloud is supported.
- 5MP cameras received a 3 MP downscale resolution option.
- Enhanced prediction can be disabled in Encoder Profile Expert settings for compatibility with non-compliant software decoders that do not support long-term references.
- IGMPv3 enhancements to support source-specific multicast (SSM) scenarios.

VCA

- An object that triggered an alarm is marked accordingly and displayed in orange color for a short period to allow easier visual detection.

For details on enhancements and changes in Intelligent Video Analytics and Essential Video Analytics, please refer to the separate release notes.

8.37 Changes with 6.60.0065

- An issue in a multipathing scenario, where during start-up 802.1x EAP/TLS caused iSCSI recording to use the alternative path, is fixed.
- An issue where the ONVIF metadata stream occasionally stopped is fixed.
- Remote recording on CPP-ENC devices is fixed but requires CPP-ENC devices to run FW 5.97.10 or higher because of the recently added security features, which impact RCP+ communication and password handling.
- The default use of 1024 bit RSA keys for self-signed certificate generation is limited to cameras with older hardware that would require time-extensive 2048 bit key generation in

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software. On all cameras with hardware acceleration a minimum length of 2048 bit is used for RSA keys by default. Certificates with 2048 bit keys can be used on all cameras.

8.38 Changes with 6.51.0028

- This version includes a fix for a recently discovered security vulnerability CVE-2018-19036. The vulnerability potentially allows the unauthorized execution of code on the device via the network interface. Bosch rates this vulnerability at 9.4 (Critical) and recommends customers to upgrade devices with updated firmware versions.
  For detailed information please refer to the published Security Advisory.

8.39 New Features with 6.51.0026

- **Support of AUTODOME IP starlight 5000i (IR) family**, incl.
  o up to 32 privacy masks
  o 8 instead of 5 corner points per privacy mask
  o High Dynamic Range (HDR)
- Third-party serial protocol over IP is now supported for Pelco and Cohu protocols.
  Please note that a special license is required as this functionality lowers the overall security of the camera. Extra measures might be needed to be put in place to protect the system.

8.40 Changes with 6.51.0026
- Password reset mechanism changed
  o Clearing passwords of all three legacy users was changed to only reset/change the password for the user 'service' to 'service', while passwords of all other users including 'live' and 'user' as well as other 'service' users stay unchanged.
  o The user can then logon to the camera using user 'service' with password 'service'. He should then change the password for the service user again.
- General privacy mask improvements
- Long-term reference enhancements to improve support for 3rd party decoders

8.41 New Features with 6.50.0128

- **Improved image performance for the following cameras:**
  o DINION IP 4000i IR
  o DINION IP 5000i IR

- o DINION IP starlight 6000i IR
- o FLEXIDOME IP 4000i
- o FLEXIDOME IP 5000i
- o AUTODOME IP 4000i
- o AUTODOME IP 5000i

- **Image pre-processing enhancements on DINION IP starlight 6000i IR:**
  - o A user slider to tune the maximum gain allowance is added
  - o A user slider to tune the day to night switch-point is added
  - o A new scene mode is now available for optimized License Plate Recognition (LPR)

- **Intelligent Streaming enhancements**
  - o Statistics pages have been added for live and recording streams. These provide guidance for optimally adjust bitrate and quality settings, and make judgement on averaging easier in order to optimize storage consumption.
  - o Intelligent Streaming configuration parameters in encoder profiles are now grouped.
  - o Encoder quality regions are now also supported on CPP7.3 platform.

- **Highly reliable SD card recording with life cycle monitoring**
  Industrial SD cards which provide wear level data can be monitored for their health and expected lifetime, providing much more reliable SD card recording.
  Three vendors have been tested and qualified:
  - o Sony
  - o SanDisk
  - o Micron

  Due to the high dynamic in the SD card market, no direct reference to the models is given. Latest Industrial SD cards from all three vendors support this feature.

- **ONVIF Profile T is now supported**
- H.265 B frames support can be selected in Installer menu to allow for lower bitrates at certain resolutions.
- Digital zoom is now support on thermal image of MIC IP fusion 9000i
- Thermal module flat-field correction (FFC) on MIC IP fusion 9000i can be set to 'auto modus'.
- Intelligent Tracking can be triggered by point-and-click feature in web interface.
- Manual iris control for AUTODOME 4000i/5000i has been added.
- Current gain value is visualized in video preview window.
- The ID out of the best face detection is attached to the JPEG filename when posted via FTP and also added to the metadata stream to allow searching.
- SNI support has been added to improve load-balancing for cloud-based solutions.

Security features
- **Software Sealing**

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The camera configuration can be 'sealed' once it should not be changed anymore. Any change of the sealing status and any change to static configuration, accidentally or intentional, will break the seal, creating an alarm message that can be used by the video management system to launch an appropriate alarm scenario.
All modifications affecting the sealing status are logged separately.

- Firmware files are now encrypted.
- Files received via HTTP upload are checked for correct size.
- "Secure renegotiation" is signalled in TLS.
- In case of certificate user authentication, the clock base is re-adjusted, e.g. after battery loss.

8.42 *Changes with 6.50.0128*

- After updating to firmware version 6.50, users will be able to take advantage from boosted performance and enhanced image quality on all CPP7.3 (4000i, 5000i, 6000i) based cameras:
  - Overall improved contrast and sharpness (reduced haziness)
  - Improved visibility in scenes with highlights and dark areas
  - Improved facial detail visibility in scenes with strong backlight
  - Maintain more color in dark scenes
  - Stronger sharpening when it is getting darker by directional sharpening
  - The default shutter function in the ALC menu is now also available in HDR mode
- Specifically for the AUTODOME IP 5000i two additional improvements are available:
  - Better preserved highlights in dark scenes
  - Improved depth of field by introducing zoom-dependent iris control
- Missing SD resolutions have been added to stream 1 options.

8.43 *Changes with 6.44.0020*

- Cipher suites were enhanced by TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256.
- An issue with simultaneous multicast streams, introduced with FW 6.43, has been fixed.
- An issue with ONVIF SetImageSettings, where incorrect settings could be applied when an unsupported namespace was used, has been fixed.
- An issue with ONVIF IVA messages suspended, when more than one IVA rule was configured, has been fixed.
- An issue with VCA calibration lost after image rotation has been fixed.
- An issue with EAP-TLS certificates with CRL extension, intermittently prohibiting authentication, has been fixed.
- An issue with panoramic cameras, where pre-positions could not be set in the web interface when in on-board dewarping mode, has been fixed.

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- Various smaller issues have been fixed.

8.44 New Features with FW 6.43.0027

- ITS versions of AUTODOME and MIC cameras can be enabled to allow NTCIP protocol over serial interface.
- A possibility to increase the Power-over-Ethernet (PoE) demand signalled via LLDP has been added. This may help to optimize the power management on switches and e.g. also eases to use the cameras in outdoor housings with PoE-powered heating systems.
- IGMP version can now be set to a specific version. Automatic detection is still default.

8.45 Changes with FW 6.43.0027

- After updating to firmware version 6.43, users will be able to take advantage from boosted performance and enhanced image quality of AUTODOME IP 5000i and AUTODOME IP 5000i IR:
  - o Improvement on depth of field
  - o Overall improved contrast
  - o Improved visibility for foggy scenes
- After updating to firmware version 6.43, users will be able to take advantage from boosted performance and enhanced image quality of AUTODOME IP 4000i:
  - o Overall improved contrast
  - o Improved visibility for foggy scenes
- Improvements on Multipathing support for storage devices.
- Various smaller issues have been fixed.

Note:

Due to improved image tuning in this firmware version, the behavior of various image enhancement sliders can be different than in older FW releases. Therefore it is recommended to perform a "Restore Mode Defaults" after the firmware update is finished in order to get the best performance. This button can be found under: Configuration -> Camera -> Scene Mode

8.46 Changes with FW 6.42.0021

- Stronger user name and password policy is enforced. The following rules apply:
  - o User names must be at least five (5) characters long.
  - o User name and password must not be identical.

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      o   A password must consist of minimum eight (8) characters.

      o   A password must contain both upper-case and lower-case letters.

      o   A password must include one or more numerical digits.

      o   A password must include at least one of these special characters:
         ! ? " # $ % ( ) { } [ ] * + - = . , ; ^ _ | ~ \
         Other special characters (like space @ : < > ' & etc.) are not supported.

- Multicast discovery port is now configurable via browser interface.

- The base frame rate default for DINION IP bullet 6000i has been changed to 60 fps.

- An issue where sporadically no video was shown after power cycle has been fixed.

- An issue where Automatic Network Replenishment ANR failed when SD card is broken has been fixed.

- Improved behavioural response on denial of service attacks.

- Various ONVIF communication issues have been fixed.

- Various smaller issues have been fixed.

8.47 Changes with FW 6.41.0037

- Various smaller issues have been fixed.

8.48 Features with FW 6.40.0240

Encoding

- Support of H.265 compression
A camera can be configured to use either H.265 or H.264. As H.265 requires more CPU performance, there might be limitations to maximum frame rate under certain conditions.

Note:
H.265 requires approx. 4 times the performance for decoding compared to H.264.
Installed workstations, decoders and software might lack the performance to fluently decode H.265 streams.

Intelligent Streaming

- Intelligent Streaming is a combination of features and functions to optimize bitrate consumption of recorded video. It benefits from improved noise reduction in still areas of the image, an average noise level communicated to the encoder, larger GOP size, strong use of prediction in case of B slices, and dynamic tuning of quantization parameters (QP) in the encoder.

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- The strength of the bitrate optimization can be set via 5 levels. Savings can be up to 90% using H.265 compression but are strongly scene-dependent.

- Intelligent Streaming is enabled by default in medium setting.

Imaging

- Support of 120 dB high dynamic range for 5000 camera series has been added.

- Improved noise filtering in still scenes.

VCA

For details on VCA 6.40 please refer to the separate release notes of Essential Video Analytics or Intelligent Video Analytics.

ONVIF

- ONVIF manual iris and focus controls added.

- Feature coverage of the ONVIF metadata stream has been extended to include e.g. object classes, object shape polygons, faces, flame and smoke detection info.

- Profile G support

  o Recording start and control has been added.

  o Recording search and replay functionality has been added.

  o Tested with ONVIF Device Test Tool 16.07 SR2 rev. 617.

Security

- Password enforcement

  o New cameras with this firmware installed will only become operable after the password for the administration level (user "service") has been assigned.

  o Other users "user" and "live" will only become accessible after the administrator assigned passwords to them.

  o Cameras which are updated to this firmware from a version lower than 6.40 will not change their behaviour and remain at their former protection level unless reset to factory defaults.

- Signed firmware file enforcement
  Only Bosch-signed firmware will be accepted by the camera without compromises.

- Data encryption on iSCSI storages

  o The payload on an iSCSI drive is encrypted using a symmetric XTS encryption scheme (block encryption).

  o The camera uses a number of public keys to asymmetrically encrypt the XTS key for multiple receivers. These public keys are maintained in the certificate store via certificates. Usage can be defined as for „recording1" and/or „recording2".

  o Payload encryption is possible on SD cards as well as on external iSCSI storage.

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- o A client that shall be allowed to replay this footage must have its cert/key registered and activated.
- o The Video Recording Manager (VRM) may also be a receiver to decrypt the payload data for replay.

- SRTP payload encryption for live and replay
SRTP provides payload encryption of UDP streams via TLS, similar to what HTTPS does by using TLS for TCP streams. Also encrypted multicast connections are possible.

- SNMPv3 support

  - o New alternative SNMP support provides encryption and authentication. This new service will provide pure MIB-II access.

  - o Legacy functions, like NTCIP support or mapping of dedicated RCP commands to SNMP Enterprise MIB nodes, are only provided with existing SNMPv1 implementation.

- Certificate revocation list (CRL) support

- To improve usability and provide a more compact overview, the web user interface for the certificate store has been updated. It now allows direct tagging of certificates for usages. The former split into two areas (Files and Usage) is removed.

- Stronger encryption and password protection for configuration file

  - o The configuration file is encrypted and password-protected before download.

  - o The user as the owner of this configuration file is prompted for the password.

  - o The password is required when the configuration file is uploaded to a camera.

  - o The configuration file is encrypted using standard mechanisms but not intended to be opened or modified by the user, thus the encryption key itself is kept internal and not exposed.

- Stronger encryption for maintenance log file
The maintenance log file as being used in tech support cases is encrypted with a Bosch public key. Only tech support staff is authorized to decrypt and open the file.

- The minimum TLS version can be defined, e.g. to avoid vulnerabilities from TLS 1.0 and 1.1.

- The Telnet console has been completely removed and is substituted by a new logging facility providing:

  - o A more structured output including timestamp, severity and module sources

  - o Search and filtering for specific events via web user interface

  - o Direct output to a syslog server

  - o Configuration to produce similar "debug" printouts for tech support as previously

- Consolidation of running services, visualized on new page "Network Services".
Only those services (HTTP, HTTPS, RTSP, RCP, iSCSI, NTP, discovery, ONVIF discovery) are running which are required for activated functionality. All other services (FTP, SNMP, UPnP, GB/T 28181) and their respective ports are deactivated.

- The password unlock functionality (support recovery option) can be disabled.

- CHAVE cameras

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- o   Multiple trusted issuers are now allowed for client certificate authentication.
- o   An option to not wipe the SXI certificate when a factory default is issued has been added.
- •   Installation Code has been enhanced with a block for crypto-coprocessor version indicators. The Installation Code thus has a length of 48 digits instead of only 44 digits.

Miscellaneous

- •   SMTP port is configurable via web interface.

- •   Multipathing support for storage devices.

- •   User name from certificate for EAP-TLS is used as EAP identity, if provided.

- •   Dynamically colored privacy masks, depending on surrounding video added. This can be used to not distract the operator due to intense color, e.g. white privacy mask in night scene.

- •   Cameras can connect to the CBS Remote Portal installer service.

- •   New illuminators for MIC 7000 are supported.

- •   Large OSD font can be selected, roughly doubling the size of the fonts used for stamping.

- •   Intelligent Auto Exposure (IAE) has been extended to cameras without FPGA.

- •   An event playback button has been added to the Live page to allow a quick playback of the last event in case there was an incident and the camera was connected remotely to check what happened instead of checking live and then go to the playback page.

- •   Default device date is set to firmware build time in case of invalid RTC time to avoid lock-out in case of certificate-based authentication.

- •   Dropbox API has been updated. The API used before was going obsolete on June 28th, 2017.

- •   Improved certificate parser to support more attributes used e.g. by various mail providers.

- •   A banner mode for stampings has been introduced, allowing large scale stamping on top or bottom of image.

The firmware basis is equivalent to the platforms CPP4, CPP6 and CPP7 and inherits all the features that exist upon them.
The "Previous Revisions" section thus mainly lists the features that are commonly introduced with the FW 6.40 for all four platforms in addition to the unique features introduced with the platform CPP7.3.
For earlier features please refer to release notes from the other platforms.