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iseg Communication Server 2 (iCS2) Changelog

iCS v2.12.1

- Includes all changes from iCS v2.10.4.

iCS v2.12.0

- Includes all changes from iCS v2.10.3 and iCS v2.11.0.
- Added Support for Wiener LV Fantray UELNG devices.

iCS-Service v2.7.4 -> v2.7.5

- Fixed that after a module firmware update the crate controller was no longer listed in the hardware detection list.

isegHAL v1.9.0

- Changed the “repeat command” function of the examples to not print the command again, as it is already contained in the output.

```
isegHAL> 0.0.FirmwareName
'0.0.FirmwareName': 'H101C1' (Q: 002 ...)
isegHAL> [ENTER]
'0.0.FirmwareName': 'H101C1' (Q: 002 ...)
```

- Added support for Wiener LV Fantray UELNG at address `*.1100`:
  - The complete Item list for the Fantray is documented on `item_list.html`

  - Crate Controller Item `*.1000.FanSpeedHv` to provide the information about the lowest required fan speed for the HV modules. The item value can be between 5 and 100 percent.
  - Crate Controller Item `*.1000.FanFollowUpTime` to control how long the fan should run at higher speed after power off"

iCSweb v2.11.0

- Generate EPICS substitution file with Wiener LV Fantray UELNG entry.

EPICS v2.2.0

- Added modules RecCaster, IocStats, ReTools and caPutLog.
- Added support for WIENER LV Fantray UELNG device: * Data base file for controling and monitoring the fans. * Support for Crate Controller (`*.1000.*`) and Fantray (`*.1100.*`) Items.

icsTools v1.4.0

isegCanTraceCLI

- Added decoding of floating voltages (low cost floating modules with firmware E16F3), voltage bottom (STACK modules with firmware E08F7), and error code and timestamp messages.

isegExamples v1.0.0 -> v1.0.1

- Fixed port handling in `scpi/iseg-ethernet.py` script.

iCS v2.11.0

isegHAL v1.8.0

- Fixed a freeze with the Peak CAN connection on Windows when a bus heavy or bus off state occurred.
- Added additional internal positive (11) and negative (12) analog supply voltages for the E16F3 low cost floating ground modules:

```
0.15.Supplies[11] ->  27.1010
0.15.Supplies[12] -> -26.8571
```

- Added support for Wiener LV MPODHR (high resolution) devices.

iCS v2.10.4

- Fixed that no valid MAC address and serial number were displayed in the webfrontend for device that were delivered with iCS from v2.10.1 to v2.10.3.

iCS-Service v2.7.4 -> v2.7.5

- Fixed that after a module firmware update the crate controller was no longer listed in the hardware detection list.

isegUPnP v1.0.2 -> v1.0.3

- Fixed that devices delivered with iCS versions from v2.10.1 to v2.10.3 could not be found by iCSfinder / Windows Explorer.

isegExamples v1.0.0 -> v1.0.1

- Fixed port handling in `scpi/iseg-ethernet.py` script.

iCS v2.10.3

iCS-Service v2.7.3 -> v2.7.4

- Fixed that sometimes the Ethernet and WiFi settings were not applied.

icsTools v1.3.0

- Added decoding for the EDCP DataID 0x12A1 (`EDCP_DATAID_MOD_CONFIGURE_SAVE_SET_VALUES`).
- Added decoding of DCP General Status (`Data-ID 0xC0`) and DCP Emergency off (`Data-ID 0xD4`).

iCS v2.10.2

- Fixed web browser and SHRcontrol websocket connection problems. This occurred on devices without RTC or if the system time went backwards, e.g. when setting the time manually or by time server. Now the connection problems can be solved by a hardware reset of the iCS system.

isegHAL v1.7.2 -> v1.7.3

- Fixed crashes when giving excessive long string parameters to the `iseg_connect()`, `iseg_disconnect()`, `iseg_getItem()`, `iseg_setItem()`, or `iseg_getItemProperty()` API calls.

iCS-Service v2.7.2 -> v2.7.3

- Fixed that the firmware update progress was not shown correctly while updating modules or crate controllers.
- Fixed that the websocket server crashed if the hardware configuration was modified, e.g. modules were added.
- Fixed that the configuration files for web interface, isegIOC and isegSNMP could be misconfigured when automatic hardware configuration is enabled. In the web interface the CC24 master (crate controller) was missing.

isegSNMP v2.2.2 -> v2.2.3

- Fixed that only the module at address zero was accessible by SNMP. This could happen on an iCSmini or with a CC24 crate controller when the automatic configuration at system start failed. This error happened whenever the `iseg_snmp.sub` file contained a `0` instead of `1000` for the CC24 address.

isegUPnP v1.0.1 -> v1.0.2

- Fixed that the devices only showed up in iCSFinder for about two seconds every 30 minutes.

iCS v2.10.1

- Fixed that no valid MAC address and serial number were displayed in the webfrontend.

isegUPnP v1.0.0 -> v1.0.1

- Fixed that the iCS device could not be found. This error could occur if a factory reset was performed after an iCS update.

icsTools v1.2.0 -> v1.2.1

isegCanTraceCLI

- Fixed that the frame direction (RX, RQ, TX) was missing when the output was redirected to a file or pipe.
- Allows to disable the output color with the `--no-color` command line option.
- Fixed frame direction (TX, RX, RQ) decoding and color.

SHR

SHRcontrol v1.4.1 -> v1.4.2

- Fixed that set voltage and current setting values are not applied directly when clicking on “AUTO-APPLY”. The values were only accepted after turning the wheel again.

iCS v2.10.0

- Update Board Support Package to support new hardware revisions. The ethernet phys have been replaced by the supplier and require updated drivers. Changing back to iCS versions older than v2.10.0 is not possible for devices delivered with iCS v2.10.0 and newer!
- Internal stability improvements for initial startup.

iCSweb v2.10.0

- Internal stability improvements.

iCS v2.9.3

iCSweb v2.9.0 -> v2.9.1

- Fixed in voltage change dialog that the ok and close button were not permanent visible at the bottom of the dialog.

SHR

SHRcontrol v1.4.0 -> v1.4.1

- Fixed that the Events and Errors were not shown on SHR screen.

iCS v2.9.2

isegHAL v1.7.1 -> v1.7.2

- Fixed that setting multiple channel control bits by calling `iseg_setItem(xxx, "x.y.z.Control:i", "value")` multiple times resulted in `ISEG_ERROR` and did not accept the second and following values. This could for example happen with the following SCPI commands: `:VOLT EMCY CLR,(@1);:VOLT ON,(@1)`

iCS-Service v1.7.1 -> v1.7.2

- Fixed that the web socket channel items `Status.currentLimit` and `Status.voltageLimit` had wrong values and units.

iCS v2.9.1

isegHAL v1.7.0 -> v1.7.1

- Fixed that some items and properties were not filled correctly for certain devices. Problems occurred for EBS (which has two voltage limits `-Vmax` and `+Vmax`) and MICC which has the additional item `HighVoltageOk`. For these devices, at least the item `Article` and the properties for `Control`, `VoltageSet` and `CurrentSet` were empty and with quality error.

iCS-Service v2.7.0 -> v2.7.1

- Fixed that some system services e.g. isegioc, hostapd and udhcpd sometimes failed to start. (Corresponds to changes in the image build system.)

isegSNMP v2.2.1 -> v2.2.2

- Fixed that the item `moduleRampSpeedCurrent` could not be written due to a datatype mismatch.

SCPI v1.3.0 -> v1.3.1

- Added the missing command `:EVENT 1234,(@3)` to clear selected channel events.

icsTool v1.1.0 -> v1.2.0

CanTraceCLI

- Added group current and voltage limit decoding.
- Avoid ANSI escape sequences in text output by disabling the color when the output is redirected to a file or a pipe. Color can be forced with the `--color` command line option.

iCS v2.9.0

- Contains all fixes and features included in iCS v2.8.4
- Added Python SCPI examples to download from the iCSconfig > SCPI web page.

isegHAL v1.6.5 -> v1.7.0

- Fixed that reading back the module ramp speed voltage and current within a few milliseconds after writing them returned the old value and quality 005. The value was correctly reported after approx. 100 milliseconds.
- HAL Example: Fixed that running scripts could not be stopped, it was only possible to kill the whole example with Ctrl+C. Now every keypress stops the script.

iCS-Service v2.6.2 -> v2.7.0

- Fixed that single channel, crate and module events and errors could not be retrieved by websocket access. It was only possible to read or set the entire registers with `Event.*` or `Error.*`, which returned all events resp. errors. The query and the deletion of single module events and errors with `Event.[eventName]` or `Error.[eventName]` were previously rejected by the websocket server and not processed.
- The temperature unit was fixed to "°C" (degree Celsius). It was previously transmitted without degree symbol as "C". The unit of the following items is affected:

  ```
  Setup.temperatureTrip
  Setup.temperatureTripMax
  Status.temperature
  Status.temperature0
  Status.temperature1
  Status.temperature2
  Status.temperatureExternal
  ```

- The SCPI service can now be started, stopped and restarted via websocket. It is also possible to configure the autostart behavior of the service.

iCSweb v2.8.4 -> v2.9.0

- Added configuration page for SCPI service.
- Added the configuration of external Inhibit action in order to configure the HV behaviour when an Inhibit signal was toggled. Action values:
  - no action
  - turn off channel with ramp
  - shut down channel without ramp
  - shut down all module channels without ramp
  - disable external Inhibit action

SCPI v1.2.1 -> 1.3.0

- Added the ability to suppress empty answers for commands that don't create answers.

icsTools v1.0.0 -> v1.1.0

isegCanTrace

- Improvements for CLI outputs.
- Added short Bit descriptions.
- Empty data fields are now marked with `[]`.

isegExamples v1.0.0

- Added first examples to the iCS image.

SHR

SHRcontrol v1.3.3 -> v1.4.0

- Added SCPI service to the configuration menu.
- Internal improvements to increase reliability.

iCS v2.8.4

- Added check for unset device serial numbers. This could result in the MAC address being `00:14:2d:00:00:00`. Affected devices should be reported to the iseg support as a matter of urgency.
- Python3 examples: Fixed that the `clientCommon.py` could not include the iseg library `libicsClientPython3.so`. E.g. the `iCSPythonDataLogger.py` example no longer worked. This was broken in iCS v2.8.0

iCSweb v2.8.3 -> v2.8.4

- Added a warning if the device has an unset serial number.

iCS v2.8.3

- Fixed that the iCS configuration via USB drive does not worked with a brand new device.
- Fixed that FAT formatted USB drives sometimes could not be used for writing if they contained file system errors. E.g. writing the current IP configuration often failed if the USB drive was not properly removed in Windows before.

isegHAL v1.6.4 -> v1.6.5

- Fixed crashes when using 16 CAN lines, e.g. when using a SysTec CAN interface.

iCSweb v2.8.2 -> v2.8.3

- Fixed that the current unit for SHR devices was not correct after an factory reset.

isegSNMP v2.2.0 -> v2.2.1

- Internal improvements regarding build process.

iCS v2.8.2

isegHAL v1.6.3 -> v1.6.4

- Fixed that modules with less than 8 channels are not supported for LV.
- Fixed memory overflows due to log files that are too large for LV.

iCS-Service v2.6.1 -> v2.6.2

- Fixed factory reset behavior.

SHR

SHRcontrol v1.3.2 -> v1.3.3

- Fixed that the fan did not work correctly, it was either off or running full speed.
- Lock the buttons and the rotary wheel during a factory reset.

iCS v2.8.1

isegHAL v1.6.2 -> v1.6.3

- Fixed that the item `FactoryReset` could not be set by `iseg_setItem`.

SCPI v1.2.0 -> v1.2.1

- Fixed that the serial communication was completely broken in iseg SCPI Service v1.2.0.

SHR

- Handle customer-specific display parameters during a factory reset. #### SHRcontrol v1.3.0 -> v1.3.2
- Internal improvements regarding logging.
- Fixed that a factory reset was not finished when the display showed "RESET SUCCESSFUL".

iCS v2.8.0

- Contains all fixes included in iCS v2.6.7 and iCS v2.7.3.
- Settings for isegHAL and iCS-Service can now be made persistent as U-Boot bootloader entry. These entries will be read from U-Boot environment and set to system environment on start up:
  - ISEG_HAL_FAST_START_UP
  - ISEG_HAL_CONF_LINE
  - ISEG_HAL_SIMULATION
- New command line tools:
  - tmux
  - vim
- Upgraded Python from version 2 to 3.
- Removed the unused and unneeded Python3 development package.
- The isegSCPI service is now also available for CC24 and iCSmini, not only SHR.

isegHAL v1.6.2

- Fixed item property quality of invalid system and line items.
- Fixed that the item 0.Status (CAN bus status) was not working on Windows.
- Fixed that the item properties for legacy ECH238 crates with address 2001 and higher had bad quality ("000"). The item properties for the crate with address 2000 already worked correctly.

  Old behavior:

  ```
  '7.CrateList': '2000,2021' (Q: 002 TR: 1620301308.2720 TC: 1620301308.2720)

  Object: '7.2021.Status' (Q: 000)
  DataType: 'UI4'
  Unit: ''
  Access rights: 'R'
  ```

New behavior:

```
'7.CrateList': '2000,2021' (Q: 002 TR: 1620301308.2720 TC: 1620301308.2720)

Object: '7.2021.Status' (Q: 002)
DataType: 'UI4'
Unit: ''
Access rights: 'R'
```

- Fixed that all item properties for legacy ECH238 crates (address >= 2000) had good quality ("002"). They now have error quality ("004") if the item is valid but no crate is connected or invalid quality ("000") if the item doesn't exist:

  Old behavior:

```
'0.CrateList': '' (Q: 001 TR: 1620301307.0173 TC: 1620301307.0173)

Object: '0.2021.Status' (Q: 002)
DataType: ''
Unit: ''
Access rights: ''

Object: '0.2021.FanSpeed' (Q: 002)
DataType: ''
Unit: ''
Access rights: ''
```

  New behavior:

```
'0.CrateList': '' (Q: 001 TR: 1620301307.0173 TC: 1620301307.0173)

Object: '0.2021.Status' (Q: 004)
DataType: ''
Unit: ''
Access rights: ''

Object: '0.2021.FanSpeed' (Q: 000)
DataType: ''
Unit: ''
Access rights: ''
```

- Fixed that the LogLevel could not be parsed from the icsConfig.xml file.
- Speeded up the serial or USB communication with a higher baud rate for devices that support dynamical baudrate switching with the command `:CONF:SERIAL:BAUD 115200;BAUD?`
- Improved the script function in the iseg HAL Example. The commands `ECHO`, `LOOP`, `SLEEP` and `STOP` have been added and the example is now compatible with isegHAL Terminal scripts using the notation `0.1.2.Item` to query and `0.1.2.Item=123` to set an item.
- Added special logging functions for device debugging:
  - Log device time out as error.
  - Log created device identifier list as information. Both functions differentiate between modules and crate controllers (ECH238 and CC24).
- Added support for channel voltage and current ramp speed up and down over the SCPI interface, e.g. for controlling a NHR module.
- Improved transmission of voltage and current set values to the device over CAN bus, e.g. to generate a sine wave.
- Added support for system items to read the Ethernet configuration:

```
Item                Return value
EthMac[i]           00:00:00:00:00:00
EthNetmask[i]       255.255.255.0
EthGateway[i]       192.168.16.168
EthNameServer[i]    127.0.0.1, 192.168.16.12
EthState[i]         up/down
i: 0 - ethernet; 1 - wifi
```

- Fixed that only 62 modules were working on one CAN line. If 64 modules (the maximum possible on one line) were connected, the item ModuleList was empty and no communication to the modules was possible.

iseg HAL Example

- Now allows walking over all items on a line or the whole system with the following command syntax:

```
w      Walks on line zero
w 7    Walks on line seven
w 2-5  Walks on the lines two to five
w 1,3  Walks on line one and three
```

- The commands ECHO, LOOP, SLEEP and STOP have been added, and the example is now compatible with iseg HAL Terminal scripts using the notation `0.1.2.Item` to query and `0.1.2.Item=123` to set an item.

iCS-Service v2.6.1

- Added arc and arcError as Status, Event, and Error channel items. These items describe the occurrence of at least one electrical arc. More information can be found in the items.xml.
- Fixed the unhandled module and device running state `OffInfo`. In this case an empty string was set to isegItem.
- Fixed that the command Control.on was send twice to isegHAL.
- Fixed that the module-wide clearing of emergency off was not processed.
- Improved the WiFi service handling: If WiFi is turned off, the access point and DHCP services are not started. If WiFi is turned on, these services are started and a WiFi device can be connected to a running iCS system. In former releases, this was only taken into account if a WiFi adapter was connected during the startup.
- Fixed a crash when a factory reset or a set value reset was triggered, e.g. by SHRcontrol.

iseg-ioc v2.1.0

- Internal fixes.

isegHttpServer v1.0.2 -> 1.1.0

- For requests with an invalid ticket or non-existing items an error message is now returned as answer.
- Fixed that HTTP set commands for system, line, and module items did not work.

isegSNMP v2.1.5 -> v2.2.0

- The net-snmp sysDescr request is now answered with the correct iCS and isegHAL version. Previously the sysDescr response did not contain the current version numbers.

SCPI v1.1.1 -> v1.2.0

- SCPI is now available for all iCS-based devices, not only SHR, and supports multiple (up to 10) modules in a crate with a CC24 controller or iCSmini.

The additional modules are accessed by a new `(#<slot>)` parameter, e.g. `(#3)` for the module in slot 3. A channel in such a module can be specified by `(#<slot>@<channel>)`, e.g. `(#1@5)` for channel 5 in the module in slot 1. The new command `:READ:MODULE:LIST?` can be used to get a comma-separated list of available slots.

- Added commands to control and supervise the CC24 controller in a crate:

```
:CRATE:POWER?
:CRATE:POWER {0|1}
:CRATE:STATUS?
:CRATE:EVENT CLEAR
:CRATE:EVENT:STATUS?
:CRATE:EVENT:STATUS <ResetMask>
:CRATE:EVENT:MASK?
:CRATE:EVENT:MASK <EventMask>
:CRATE:SUPPLY? (@0-8)
:CRATE:TEMPERATURE (@0-2)
:CRATE:FANSPEED?
```

- Fixed the SCPI TCP server: When multiple command lines (separated by line feed) were sent to the device in short time, the answers did not match the commands:

```
:READ:VOLT?
:READ:CURR?
0.024000E3V
:READ:VOLT?
0.000001E-3A
:READ:CURR?
0.024000E3V
```

  Now the commands are answered in the correct order:

```
:READ:VOLT?
:READ:CURR?
0.024000E3V
0.000001E-3A
:READ:VOLT?
0.024000E3V
:READ:CURR?
0.000001E-3A
```

- Added the possibility to query the set value changed counter with the command:

```
:READ:MODule:SETVALUEchanges?
```

- The following commands to query information about the systems Ethernet ports have been added:

```
:CONFigure:ETHernet:ADDRess?
:CONFigure:ETHernet:NETmask?
:CONFigure:ETHernet:GATEway?
:CONFigure:ETHernet:NAMEserver?
:CONFigure:ETHernet:STATe? {up/down}
:CONFigure:ETHernet:MAC?
```

  All queries return the state of the wired Ethernet, but with the parameter `(@1)` they return the Wifi configuration.

iCSweb v2.8.1

- Internal fixes and performance optimizations.

iCS v2.7.3

isegHAL v1.5.3

- Added special logging functions for devices.
  - Log device communication timeout as errors.
  - Log device create identifier list as informations.

iCSservice v2.5.10 -> v2.5.11

- Added the following items to control the isegHAL logging behavior during runtime:
  - system
    - Setup.logPath
  - line
    - line.Setup.logLevel
    - line.Setup.logPath

iCS v2.7.2

- Contains all fixes included up to iCS v2.6.7.

isegHAL v1.5.2

- Contains all fixes included up to isegHAL v1.4.3.

iCSservice v2.5.10

- Fixed that the events/errors “arc” and “arcError” could only be cleared globally, not as single event.

iCS v2.7.1

- Internal fixes.

iCS v2.7.0

- Fixed startup problems with wiener LV can1.

isegHAL v1.5.0

- Added support for wiener MRPDI low voltage modules.

iCS v2.6.7

- Fixed firewall settings that blocked commands from the EPICS shell running on the iCS system

iCSservice v2.5.8 -> v2.5.9

- Added arc and arcError as Status, Event, and Error channel items. These items describe the occurrence of at least one electrical arc. More information can be found in the items.xml.

SCPI v1.1.0 -> v1.1.1

- Fixed that the commands `:CONF:RAMP:VOLTAGE` and `:CONF:RAMP:CURRENT` (and their subtrees `:UP` and `:DOWN`) were not working, only the short commands `:CONF:RAMP:VOLT` and `:CONF:RAMP:CURR` did work.

isegsnmp v2.1.4 -> v2.1.5

- Fixed that sysMainSwitch always returned zero (off) for SHR and iCSmini devices. It returns one (on) now. Also, changing the state of sysMainSwitch is now prohibited for these devices

iCS v2.6.6

- Fixed start problems of the CAN driver. Sometimes a deadlock could occur and prevent the CAN interface from starting.
- Fixed that the CAN bus was not working after updating from old iCS version prior v2.4.0. The U-boot device_type variable was not set in these old releases.

iCSservice v2.5.5 -> v2.5.8

- Reduced the websocket messages pushed to the clients by using the configured unit precision from the iCSconfig.xml instead of hardcoded values That means: Only values changes exceeding the precision are pushed to the client.
- Reduced the system load by 50 percent through optimizations in iCSservice and isegHalServer
- Fixed that measured values were not transmitted over websocket if they changed very slowly over time.
- To reduce network traffic, temperature items will only be refreshed when their value changes more than 0.1 Kelvin.

isegHAL v1.4.2 -> v1.4.3

- Fixed that the channel items:
  - Status
  - Control
  - EventStatus
  - EventMask for older modules with 6 digit serial number had value zero and invalid quality.
- Fixed invalid quality of crate properties from the second crate in the CrateList.

iCS v2.6.5

iCSservice v2.5.5

- Fixed ip-config.txt file is zero on an USB flash after startup up.

isegHAL v1.4.2

- Fixed that the current limit was zero when a module was hot plugged into a crate.

iCS v2.6.4

iCSweb v2.6.4

- Added start, stop and restart during runtime for isegHTTP interface.

iCSservice v2.5.4

- Added runningState item value “offInfo” when the channel HighVoltage output is off and a High Voltage input comes from outside in order to inform about this constellation.
- Fixed a mismatch between hardware config and hardware detect after factory reset.
- Fixed item description Status.runningState, values “errorInfo” and “errorOn” in channel and module branch.
- Renamed items Status.serviceNeeded, Event.serviceNeeded and Error.serviceNeeded
- Fixed missing module push events and errors like Error.needService, Event.temperatureNotGood and so on.
- Added item Hardware.options[0] to read out the Hardware option bits Added item Option.inhibit to read out the configured INHIBIT:

  `"none", "IU", "ID", "NIU" or "NID"`

isegHAL v1.4.1

- Added the item HardwareOptions to access the devices hardware options as 32 bit word.
- Fixed a crash when modules with CAN addresses greater than 16 are controlled via the CAN lines

SHR

SHRcontrol v1.2.3

- Now a channel that is not switched on, but has a measured output voltage (e.g. the channel is externally supplied by a capacitor) behaves as follows:
  - The yellow HV-ON LED on the frontpanel is blinking
  - The channel display shows “OFF” on yellow background In former times, a misleading “ON” with green background was shown, and the missing “constant voltage” and “constant current” flags were the only hints that something is wrong.
- Fixed missing module errors and events after power up. For instance when the safety loop was opened before powering on the SHR an Error.safetyLoopWasOpened must be displayed after the start up of SHRcontrol.
- Fixed display brightness.
- Added display of INHIBIT option:

  `MENU: SETTINGS > DEVICE INFO > INHIBIT`

- Added INHIBIT Mode in “Channel setup” in order to configure the action of the HV output after an INHIBIT event.
- Fixed changing time or date with the virtual keyboard.

iCS v2.6.3

- Updated Toradex Linux board support package to v2.8.7
  - Linux kernel 4.9.220
- Fixed to the correct RTC devices for:
  - CC24-2: m41t81s
  - iCSmini-1/2: m41t0m6
  - SHR-1: m41t81s

isegHAL v1.4.0

- Added support for the channel voltage/current ramp speed up/down/min/max to all devices which support this in the device firmware. Before, this function was only available for NHR and SHR.
- Fixed that the first requests of delayed trip and external inhibit items failed for devices with six digit serial number.

iCS v2.6.2

- Fixed that the root file system was not expanded to the full size of 1 GB after an update.

iCSservice 2.5.2

- Fixed wifi function which was not working in iCS v2.6.1.
- Added the possibility to activate wifi with iCSconfig enable at runtime.

SCPI v1.1.0

- This release contains only internal code improvements, but no new functions.

iCS v2.6.1

- Upgraded Toradex Linux board support package to v2.8.6
  - Linux kernel 4.9.166
  - lighttpd 1.4.45
  - PHP 7.1
  - Codeigniter 3.3
- Activated firewall with nftables
- Expand the size of the root-partition from 512MB to 1024MB. For this the size of the user-Partiton was reduced by 1024MB.
- Disables unused/unsupported can interfaces for iCSmini2 and SHR.
- Add support for USB-CAN interfaces (manufacturer: EMS, PEAK).
- Show correct iseg-software versions during the build process and runtime.

iCSservice v2.5.1

- Added saving and reloading of channel profile “AutoSave”
  - e.g. SHR “Save configuration” to and “Restore configuration” from USB flash

```
<channelProfiles>
   <channelProfile title="AutoSave" id="e143366b">
      <channel id="0_0_0">
         <item quality="2" value="0" id="Control.on" unit=""/>
         <item quality="2" value="2.0E+03" id="Control.voltageSet" unit="V"/>
         <item quality="2" value="4.0E-03" id="Control.currentSet" unit="A"/>
         <item quality="2" value="5.0E+01" id="Control.voltageRampspeedUp" unit="V/s"/>
         <item quality="2" value="6.0E+01" id="Control.voltageRampspeedDown" unit="V/s"/>
         <item quality="2" value="2.0E-03" id="Control.currentRampspeedUp" unit="A/s"/>
         <item quality="2" value="2.0E-03" id="Control.currentRampspeedDown" unit="A/s"/>
         <item quality="2" value="4" id="Setup.delayedTripAction" unit=""/>
         <item quality="2" value="0.0" id="Setup.delayedTripTime" unit="s"/>
         <item quality="1" value="0.0E+00" id="Setup.voltageBottom" unit=""/>
      </channel>
      ...
```

```
        </channelProfile>
    </channelProfiles>
```

- Added system item Status.icsVersion containing the current iCS version number.
- Added parameter “n” to specify the file name for icsConfig up- and download functions and a request of iCS configuration file list
  - Upload:

```
{
    "i": "55005e1a49cad-46",    // session id, received by login
    "t": "request",             // type request
    "c": [                      // content array, collects different request pakets
            {                       // request paket object
                "c": "uploadFile",     // command: save file
                "p": {
                        "i": "icsConfig",       // item (source file)
                        "s": "USB",             // source
                        "n": "my-icsConfig.xml" // load file as current configuration
                }
            },
            {                       // request paket object
                "c": "fileList",     // command: file list
                "p": {
                        "t": "icsConfig",       // item (source file)
                        "s": "USB",             // source
                }
            }
    ],
    "r": "websocket" // session response type
}
```

  - Download:

```
{
    "i": "55005e1a49cad-46",    // session id, received by login
    "t": "request",             // type request
    "c": [                      // content array, collects different request pakets
            {                       // request paket object
               "c": "downloadFile",     // command: save file
               "p": {
                        "i": "icsConfig",        // item (source file)
                        "d": "USB",              // destination
                        "n": "my-icsConfig.xml"  // store current configuration to file my-icsCon
                }
            }
    ]
    "r": "websocket" // session response type
}
```

SHR

SHRcontrol v1.2.0

- Improved input to save and restore the iCS configuration
  - Including automatic creation of channel profile “AutoSave”
- Fixed displaying the current iCS version number

SCPI

- Fixed USB connection problems when USB cable was already connected during SHR power-up.

iCS v2.5.7

iCSweb v2.5.13

- Added to isegHAL documentation:
  - a link to the CAN_EDCP_Programmers-Guide.pdf in bit addressing pages.
  - control bits for legacy mode and High Voltage backplane automatic on.
  - item outputUserConfig for 0MPV (W-IE-NE-R) modules.

iCS v2.5.6

- Fixed potentially problems when resizing the file system.

iCSweb2 v2.5.12

- Fixed iseg_epics.sub file configuration of ECH238 slave crates with adresses greater or equal 2000.
- Example sub file with CC24 and slaves controllers CC23 and ECH238 connected by CAN bus:

```
## this file is loaded via "dbLoadTemplate" from the IOC
file "/mnt/user/data/config/iseg_epics_system.db"
{
pattern {CONTROLLER_SN,CAN_LINE,PORT}
{5230449,0,"AUTO"}
{5230000,1,"AUTO"}
{490030,2,"AUTO"}
}

file "/mnt/user/data/config/iseg_epics_crate.db"
{
pattern {CONTROLLER_SN,CAN_LINE,CRATE_ID,PORT}
{5230449,0,1000,"AUTO"}
{5230000,1,1000,"AUTO"}
{490030,2,2001,"AUTO"}
}

file "/mnt/user/data/config/iseg_epics_module.db"
{
pattern {CONTROLLER_SN,CAN_LINE,MODULE_ID,CHANNEL_ID,PORT}
{5230449,0,1,0,"AUTO"}
{5230449,0,1,1,"AUTO"}
...
{5230449,0,1,15,"AUTO"}
{5230000,1,0,0,"AUTO"}
{5230000,1,0,1,"AUTO"}
...
{5230000,1,0,15,"AUTO"}
{7200076,2,0,0,"AUTO"}
{7200076,2,0,1,"AUTO"}
...
{7200076,2,0,15,"AUTO"}
{7800086,2,1,0,"AUTO"}
{7800086,2,1,1,"AUTO"}
...
{7800086,2,1,7,"AUTO"}
}
```

- Example sub file for SHR:

```
## this file is loaded via "dbLoadTemplate" from the IOC
file "/mnt/user/data/config/iseg_epics_system.db"
{
pattern {CONTROLLER_SN,CAN_LINE,PORT}
{2300001,0,"AUTO"}
}

file "/mnt/user/data/config/iseg_epics_crate.db"
{
pattern {CONTROLLER_SN,CAN_LINE,CRATE_ID,PORT}
}

file "/mnt/user/data/config/iseg_epics_module.db"
{
pattern {CONTROLLER_SN,CAN_LINE,MODULE_ID,CHANNEL_ID,PORT}
{2300001,0,0,0,"AUTO"}
{2300001,0,0,1,"AUTO"}
{2300001,0,0,2,"AUTO"}
{2300001,0,0,3,"AUTO"}
}
```

iseg-ioc v2.0.2

- Fixes empty substitutions for CRATE_ID or MODULE_ID and CHANNEL_ID.
  - Such an empty configuration:
    - of the module and channel pattern can occur after auto configuration without HV/LV modules in a crate with powered backplane.
    - of the crate pattern is allways happen for SHR and can occur for iCSmini2.
  - Therfore iCSweb/iCStool version 2.5.10 uses new EPICS database record definition files.

Pattern entries	System 1st pattern	Line 1st pattern	Crate 2nd pattern	Module 3rd pattern	Channel 3rd pattern
CC24	yes	yes	yes	yes / no	yes / no
iCSmini2	yes	yes	yes / no	yes / no	yes / no
SHR	yes	yes	no	yes	yes
iseg_epics.sub	iseg_epics_system.db	iseg_epics_system.db	iseg_epics_crate.db	iseg_epics_module.db	iseg_epics_module.db

- Added the splitted DB Files for reference:
  - iseg_epics_system.db for sytem and line items
  - iseg_epics_crate.db for crate items
  - iseg_epics_module.db for module and channel items
- Fixed the EPICS generation support of the older ECH238 crates.
- A new substitution file will be generated by automatic or manual configuration.
- Changed to switch expression with better expressiveness for Control:disableVoltageRampSpeedLimit:
  - on: disable voltage rampspeed limitation
  - off: enable voltage rampspeed limitation

isegsnmp v2.1.4

- Fixed that negative floating point values were potentially rounded in the wrong direction.
- Added the the SNMP OID outputUserConfig for WIENER MPV modules.
- Added the module status bit isVoltageRampSpeedLimited:

  - The module firmware limits the voltage rampspeed to 1 % because Delayed Trip or Kill Enable is active.
- Added the module status bit isVoltageRampSpeedLimitDisabled as feedback for the groupsSwitch enableVoltageRampSpeedLimit(8) and disableVoltageRampSpeedLimit(9).
- Fixed the outputStatus that the invalid bits set when the bit 31 of iseg ChannelStatus was set.
  - E.g. a ChannelStatus of '3758096520' (0xe0000088) resulted in the invalid value 0x7FFFFFFF.
- Fixed crashes of isegsnmp service if no HV or LV module is plugged and the iseg_snmp.sub file has no entries.

isegHAL v1.3.8

- Fixed missing pushed values in WebSocket application. The API function iseg_getItemValue switches to the corresponding HAL by evaluation of the item quality is OK or COMMUNIKATION_BAD.
- Fixed that the sample rate 500 was displayed as 244 in the item SampleRateList.
- Added the new HAL channel item UserConfigFlags for WIENER MPV modules. This item is used for the SNMP OID outputUserConfig.
- Documentation: Added new Control register bits for CC24 and CC23:
  - Set Legacy Mode enabled/disabled and
  - Set Backplane Auto On enabled/disabled.
- Documentation: Added links to CAN_EDCP_Programmers-Guide.pdf as a reference of the EDCP data points gives more explanation for the corresponding isegHAL item.
- Added Module Status bit isVoltageRampSpeedLimitDisabled as feedback for the Module Control bit disableVoltageRampSpeedLimit, in order to display the toggling result, for instance in isegControl1.

iCS v2.5.5

iCSservice v2.4.3

- Fixed inactive MPOD display after automatic configuration or restarting SNMP.
- Fixed automatically detection of slave crates (CC23 and ECH238).

iCSweb v2.5.9

- Fixed missing unit of delayed trip time
  - dialog channel properties (props) of iCScontrol
- Fixed loss of MPOD display communication after generation of snmp configuration
  - via iCSconfig > snmp > "generate configuration" or reset_ics(.txt) by a boot from USB flash memory.

iCS v2.5.4

iCSservice HTTP API v1.0.2

- Added a "trigger:denied" message when a HTTP request contained an invalid or expired ticket.

isegsnmp v2.1.0

- Fixed the regression that the sysStatus item could no longer be requested from SHR and iCSmini devices. The response of snmpget was: "No Such Instance currently exists at this OID".
- Added MPOD display support
- Fixed the SNMP items `ipDynamicAddress` and `ipStaticAddress`: read from the isegHAL item `EthAddress` now (was hardcoded to 127.0.0.1 before). These items are read only in this version.

isegHAL v1.3.4

- Added the items `EthName[i]` and `EthAddress[i]`, where i = 0: eth0, i = 1: wlan0
- Fixed the data type and access rights for the reversible items `OutputMode` and `OutputPolarity`.
- CAN tunnel: Changed API Read access to array `Read[2]`, kept backward compatibility of old double point separation `Read:2` Also fixed the help, moved `Write` and `Read` items from line to system.
- Fixed quality communication bad after CC24 crate was powered off.

EPICS v2.0.1

- Added the optional reversible and ramp speed per channel items in the default iseg_epics.db file located on the iCS system under /opt/epics/linux-arm/db. If you use your own EPICS DB file, from a prior version, you must manually edit it.

iCS v2.5.3

iCSservice v2.4.2

- SNMP and isegIOC are now restarted after auto configuration changes the substitution files to reflect the new configuration.

isegHAL v1.3.3

- Fixed return BOOL datatype for bit-addressed LV items Support of isegIoc LV item: `ISEG:${CONTROLLER_SN}:${CAN_LINE}`
- Fixed option name of STACK module in isegHAL html help

iCS v2.5.2

isegHAL v1.3.2

- Fixed missing values for devices with option VCT. Therefore, SHR devices were no longer recognized by iCSservice and therefore not useable in the iCS.

iCSservice v2.4.1

- Added the item `Setup.currentTrip`
- Fixed the items `Control.currentBounds` and `Control.voltageBounds`
- Fixed the auto configuration function for iCSmini

iCSweb v2.5.2

- Fixed the item `Setup.currentTrip`
- Fixed the different trip action behaviour for HV / LV in the channel properties dialog
- Adopted trip actions to HV / LV differences

isegHAL v1.3.1

- Added the item `CurrentTrip`
  - isegHAL (HV): `CurrentTrip` is an alias to the existing item `CurrentSet`
  - wienerHAL (LV): `CurrentTrip` and `CurrentSet` are two different data points

iCS v2.5.1

- Only released internal, all changes were available in v2.5.2

iCS v2.5.0

iCSservice v2.4.0

- Added automatic hardware configuration updates for CC24 and iCSmini
  - to the following files:
    - Configured hardware in `icsConfig.xml`
    - EPICS configuration in `iseg_epics.sub`
    - SNMP configuration in `iseg_snmp.sub`
  - under the following conditions:
    - master crate backplane is set on
    - after powerOn and for crates after new hardware was detected
  - Therefore, the new node `<autoConfig>` for the automatic hardware configuration was added to `icsConfig.xml`
  - Note: while the configuration files for SNMP and EPICS are regenerated, the services still use the old configuration until they are restarted.
- Added new items for Stack modules
  - to reduce the voltage set value after a discharge event in order to protect the connected detector: `Setup.voltageBottom`, and `Event.voltageBottom`
  - to control the priority controlled voltage ramp: `Setup.voltageRampPriority`.
- LowVoltage: Added the items
  - `voltageLowTrip`
    - `Setup.voltageLowTrip`
    - `Setup.voltageLowTripAction`
    - `Setup.voltageLowTripTime`
  - `voltageTrip`
    - `Setup.voltageTrip`
    - `Setup.voltageTripAction`
    - `Setup.voltageTripTime`
    - `Setup.voltageTripMax`
  - `voltageTerminalTrip`
    - `Setup.voltageTerminalTrip`
    - `Setup.voltageTerminalTripAction`
    - `Setup.voltageTerminalTripTime`
    - `Setup.voltageTerminalTripMax`
  - `powerTrip`
    - `Setup.powerTrip`
    - `Setup.powerTripAction`
    - `Setup.powerTripTime`
    - `Setup.powerTripMax`
  - `temperatureTrip`
    - `Setup.temperatureTrip`
    - `Setup.temperatureTripAction`
    - `Setup.temperatureTripTime`
    - `Setup.temperatureTripMax`
  - `timeoutTrip`
    - `Setup.timeoutTripAction`
    - `Setup.timeoutTripTime`
  - `currentTrip`
    - `Setup.currentTripMax`,
- Added new up- and download functions for configuration and driver files from and to a connected USB flash drive

  - These functions place the files in the directory `iseg-iCS` on the connected USB flash drive
  - When an USB flash drive is connected, a file `ip-config.txt` with the current network configuration is written to the directory `iseg-iCS`
- The `icsConfig.xml` will be checked for existence of node `icsConfig` before an an upload is possible
- Fixed USB AUX running state
- Fixed crashes when a device with empty attributes was configured in icsConfig.xml
- Added Python scripting functions
  - Scripts can be started and stopped from ics websocket clients
  - Data between client and script can be exchanged over websocket
  - Scripts can be configured as auto scripts that automatically start during the boot up process

iCSweb v2.5.0

- Beside diverse bug fixes, the following new features have been added:
- iCScontrol
  - Added more low voltage items to the user interface, e.g. channel-wise ramps and terminal voltage.
- iCSconfig
  - Added auto configuration to hardware section
  - Added auto configuration for catalog models to hardware > devices
  - Added control screen for the python scripts
  - Added python logging demo application

iCSservice HTTP API v1.0.1

- Added a new HTTP server for iCSservice API access
- The HTTP API now uses port 8081 instead of port 80 (iCSweb is still on port 80)
- The new server fixes several issues and ist much faster than the old Version

EPICS v2.0.0

- Attention: The format of the EPICS DB file has changed. “can0” must be replaced by ${PORT} which is defined in the SUB file after regeneration.

  A default iseg_epics.db file is located on the iCS system under /opt/epics/linux-arm/db. If you use your own EPICS DB file, from a prior version, you must manually edit it.

  Example: the following record for ModuleList

```
record( stringin,  "ISEG:${CONTROLLER_SN}:${CAN_LINE}:ModuleList" ) {
  field( DTYP, "isegHAL" )
  field( INP,  "@${CAN_LINE}.ModuleList can0" )
  field( FLNK, "ISEG:${CONTROLLER_SN}:${CAN_LINE}:CrateNumber" )
  field( TSE,  "-2" )
 }
```

  must be changed to:

```
record( stringin, "ISEG:${CONTROLLER_SN}:${CAN_LINE}:ModuleList" ) {
  field( DTYP, "isegHAL" )
  field( INP,  "@${CAN_LINE}.ModuleList ${PORT}" )
  field( FLNK, "ISEG:${CONTROLLER_SN}:${CAN_LINE}:CrateNumber" )
  field( TSE,  "-2" )
}
```

- isegIOC v2.0
  - Added W-IE-NE-R Low Voltage support

- The following EPICS packages are included:
  - EPICS BASE R3.15.7
  - Autosave R5-10
  - Calc R3-7-3

SNMP v2.0.1

- Added `voltageRampSpeedLimitDisabled` into `outputStatus` and as control item to `groupsSwitch`.
- The SNMP outputStatus now handles some channel bits as event when the channel is turned off. Otherwise bit is handled as status (is):
  - `is/EventVoltageBoundLower/Upper`
  - `is/EventVoltageLimit`
  - `is/EventCurrentBounds`
  - `is/EventTemperatureBad`
  - `is/EventMaxPower`
  - `is/EventInternalCommunicationBad`
- Added new items for stack modules:
  - `outputVoltageButtom` to reduce the output voltage after a discharge event. The new output voltage is calculated as `outputVoltageBottom * voltageSet / 100`.
  - Added the item `outputVoltageRampPriority`
- Upgraded `WIENER-CRATE-MIB.txt` to the lastest version from W-IE-NE-R
- Fixed the `sysStatus` item for CC24 controller to handle bits like `mainInhibit` and `inputFailure` are handled. Before only the bit `mainOn` was set. This introduces a regression for SHR and iCSmini, where `sysStatus` can no longer be queried.
- Fixed writing `moduleVoltageRampSpeed.maX` and `moduleCurrentRampSpeed.maX` for X > 0

isegHAL v1.3.0

- Low voltage:
  - Channel Status handles some bits as event when channel is turned off. Otherwise the bits are handled as status:
    - `VoltageBoundLower/Upper`
    - `VoltageLimit`
    - `CurrentBounds`
    - `MaxPower`
  - In contrast, the channel event status will be set when the channel is off.
- Added existing module Status / EventStatus bits to
  - Channel Status:
    - `isTemperatureBad`
    - `isKillEnable`
    - `isFineAdjustment`
    - `isVoltageRampSpeedLimit`
  - Channel EventStatus:
    - `ETemperature`
    - `ESetKillEnable`
    - `ESetFineAdjustment`
    - `EVoltageRampSpeedLimit`
- Support up to 32 crates of type ECH238 on one CAN line
- isegHAL-service now uses the username and password specified in `icsConfig.xml` instead the hardcoded defaults `user` and `pass`. The server will no longer start if one of these entries is empty.
- Fixed the integration of board A and B of double modules
- Fixed the item `IdentifierList` which is used for firmware updates in iCSconfig
- Added new items for Stack modules:
  - Added the item `VoltageBottom`, which reduces the voltage set value after a discharge event in order to protect the connected detector.

- Added the item `VoltageRampPriority` which allows to set and query the value for priority controlled voltage ramps.

SHR

SCPI v1.0.1

- Added one more digit to the precision of voltage and current values. For example, the measured voltage is now in the format `1.234567E3V`.

SHRcontrol v1.1.0

- Support of the new up- and download functions in the SETTINGS menu:
  - SETTINGS > HARDWARE SETUP > INTERFACE > USB > Save “linux-cdc-acm.inf” driver to a connected USB Flash drive
  - SETTINGS > CLEAR / RESET / BACKUP / RESTORE
    - Save configuration -> Save icsConfig.xml to an USB Flash drive
    - Restore configuration -> Restores icsConfig.xml from USB Flash drive