

# RELEASE NOTES

*GO2MONITOR/CMAS2000*

19.1

Date: 21. November 2018



Release Notes	go2MONITOR/CMAS2000 19.1	
	<b>Imprint</b>	21-Nov-18

## Imprint

**go2MONITOR/CMAS2000**

**19.1**

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## Version 19.1.

### Features and improvements:

#### General

- Manually switching between manual and automatic mode is now obsolete. Working with manual channels and automatic tasks in parallel is now possible.
- New option in a narrowband channel to record all demodulated audio in the result database automatically. The audio demodulation itself is not done in the GUI anymore but in the SignalServer component
- Redesign of the Modem list editor. New functions: sorting columns, OK/Cancel possible, description can be added/edited for each list, Empty modem lists are not shown anymore
- New function to restore the content of default (factory) modem lists
- New database columns for meta information delivered from the decoder (Sender, Recipient, Communication type,...)
- Automatic extraction of decoder meta data and storage into new database fields for some modems (HF DL, ALE-2G, ACARS, VDL2,...)
- Support for retrieving system position from GPS receivers supporting NMEA format
- Number of manual channels in the GUI can now be limited by the license too. Until now, it was only depending on the available resources
- Changed behavior of frequency blocking from an AutoMon task. Now, task blocks action immediately after starting a triggered action instead at the end of the action.

#### GUI

- Improved AutoMon task summary display in AutoMon-Wizard and in the tooltip on TaskActivity View
- Improved resource view display: alphabetical sorting, added display of "last error" information for system components, graphical display for Storage server capacity
- New map style for all map displays
- Spectrogram shortcuts in a wideband spectrogram are now available only if one signal input is available. In case of multiple signal inputs, shortcuts are disabled.
- Resource-View: Memory consumption for "Demodulation/Decoding" component now includes memory used by all APC channels (processes)
- Added additional delay for narrowband channels, 20s
- Added new AutoCoverage step durations of 1, 2, 5 and 10 seconds. These can be used for classification-only task scenarios, without narrowband channel processing.
- Added loop on/off button for file playback
- Spectrogram display in AutoCoverage mode is now the same as for normal processing (both spectrum and spectrogram are visible)
- Removed obsolete rotation feature in ResultViewer, graphical view
- Added new "Back" navigation button in ResultViewer, graphical view
- Increased upper limit for bandwidth entries in Frequencies-View and in NB-frequency AutoMon tasks from 50kHz to 300kHz
- Changed result placemark display on a map to show sender information if available
- Improved support for High-DPI display
- Maximal frequency in the GUI increased from 3GHz to 20GHz
- Changed exponential average option for spectrum overview to 0% (off)

#### APC

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- Improved result splitting for some modems (HF DL, VDL2, AIS, ACARS, DSC-HF) results so that each burst is stored as a separate result in a database
- Changed APC result output in case of Production duration==0. In that case, there will be no more production\_start tag in the result but only a new "recognition" tag.
- Added XML schema files for APC XML output format
- FSK disc.: soft symbol output support
- Pactor 2/3:
  - increased burst detector robustness to frequency deviation
  - make use of burst length information from decoder
  - improved burst start detection
- New decoders:
  - YAESU System Fusion
  - ALIS2 (was detection-only)
- Extended decoders:
  - INMARSAT-C-TDM: EGC mode (SafetyNet, FleetNet)
  - CODAN3212 (single channel): 150/300bps modes, soft decision, ARQ, STANAG5066
  - NXDN: descrambling with known key
  - Pactor 3: soft decision
  - Pactor 2/3: support for AirMail/SailMail
  - D-STAR: improved synchronization, data output
- Added XML tags for decoder meta information
  - HF DL
  - AIS
  - ACARS-VHF
  - DSC-HF/VHF
  - VDL2
  - ALE-2G

### Receiver support:

- Added support for R&S EB500 receiver
- Added Scan-Simulation for some ExtIO based receivers: RTLStick, SDRPlay, AirSpy. This is an experimental function provided for testing purposes only.
- Added new templates for high-bandwidth usecases for IZT R3000, SIR 21xx and NARDA SignalShark receivers

### Classification (affects BCU / NCU/ SignalServer):

- Symbol rate for (G)MSK classification increased to up to 125 kBd
- Symbol rate for FSK2 classification increased to up to 75 kBd
- GSM uplink modem detection
- CIS-45 33 Bd modem detection
- CIS-45 40 Bd modem detection
- CIS-60 modem detection
- CIS-93 modem detection
- CIS-112 modem detection
- CIS-128 modem detection

### BCU/BDU

- Customer defined modem detection using spectrogram pattern matching is no longer supported (we recommend detection based on IQ correlation or adaptive modem matching instead)
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- Bugfix: SIR 2115 scan support now correctly handles time gaps resulting from frequency switching
- Bugfix: In rare cases update messages for emissions that had been stopped previously occurred. This has been fixed.
- Bugfix: Changing frequencies between HF and V/UHF without reset of signalinput (e.g. for receivers supporting HF and V/UHF frequency range) now results in correct adaption of parameter settings.

## NCU

- Narrowband classifier now correctly creates stop protocols
- Real-valued input signals support added

## Remote Control interface, Integrators

- Changed dynamic port range on Linux systems in ProNet from 32768-41000 to 49152-61000 to be compatible with IANA recommendation
- SignalServer has a new function to record demodulated audio in a file
- Switching between manual/auto mode not possible (and not needed) anymore by using Remote Control API
- SignalServer now uses (and reports) effective bandwidth as its working bandwidth instead of full bandwidth (sampling rate). It does not allow DDCs with channel center frequency outside of that range.
- Improved ICD description for field FLD\_DECODER\_RESULT to clarify that multiple appearances are possible and that the a separate time information is included for each appearance
- Added optional field FLD\_MODEM\_NAME in the task status of the production task
- New object and corresponding messages for Post-Processing of decoder meta-data: OBJ\_TYPE\_POSTPROCESSOR, MSG\_POSTPROCESSOR\_RESULT etc., as well as a reference table specifying which meta-data information is extracted from which modem result.
- Because of new result post-processing functions, APC-NG component installation now also includes a Python distribution (the same as in CMAS2000/go2MONITOR).
- File paths are not stored by using absolute paths in a database anymore. Instead a placeholder "<ROOT>" is stored as a part of a path. It must be replaced with the path of the IF-Server before using the file path.
- Updated list of modems which can be recognized from the BCU
- Bugfix EmissionMonitor: Changing signal input sometimes resulted in wrong lines/s for spectrogram display

## Bugfixes

- Fixed problems with using PythonQt GUI elements in Python automation scripts in the GUI
  - Time-based wideband recordings in AutoMon did not start if frequency range was not defined in the task definition.
  - Fixed problem with deletion of the wideband recording result if it is the only result and the IF-server is almost full. In that case, the recording will stop before the IF-server becomes almost full so that the user can still see and process the recording.
  - Fixed problem with mirrored signal if R&S EM100 receiver was used
  - Fixed problem with the deletion of IF-Server files if corresponding result was opened in the ResultViewer
  - Fixed various problems with keyboard shortcuts for spectrogram(s) in the main window
  - Fixed problem with splash screen overlapping database warnings/errors at the GUI start
  - Fixed problem with offline AutoMon Missions with tasks that include recognition & decoding but no recording. Sometimes, recordings were present although not parametrized.
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- Fixed problem that channel bandwidth was sometimes not sufficient if emission was transferred from classification view into a NB-channel by using drag `n drop (10% bandwidth added).
- Fixed problem with wrong file name displayed in WB-input if the file was loaded by using ResultViewer and function "Open as file input"
- Fixed problem with delay being turned-off in a narrowband channel even if Application Setting "Set delay automatically..." was turned off
- Selection of non-result markers in ResultViewer, graphical view is now not possible anymore
- Fixed problem with displaying warning message that "frequency information is missing" even if a file could not be opened at all.
- Fixed problem with starting AutoCoverage with Receiver not currently active in any Signal-Input
- Fixed problem with using multiple WinRadio G33 receivers

**Included software components:**

- SSC
  - APC Controller
  - APC
  - SignalServer
  - BCU
  - RCM
  - GUI
  - ResultViewer
  - NCU
  - Database: v14
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## Version 18.1.

Date 25.06.2018

### Features and improvements:

#### General

- HDU added as a new product option including integration in GUI, Result-Viewer and the result database. FHSS emissions are displayed in all GUI components, stored in the database and displayed in the ResultViewer.
- Triggered wideband recordings as a new task type in AutoMon. The recording can be triggered based on modulation type recognition, modem classification or signal energy
- Added FHSS emissions as possible triggers in AutoMon
- Wideband recordings in AutoMon tasks can be parametrized with multiple time ranges, including "daily" recording times
- Manual WB-recording can now be started/stopped manually in Automatic mode
- Added new result field, "Transmission type", containing information about sender transmission type (USB, LSB, FHSS,...)
- Database/Result storage location changed from version-dependent user directory to the version-independent user directory so that the results are not lost after software update
- Automatic database upgrade function added. Starting from the next release, each new software version will automatically update the database and the result data.
- Removed version name from the installation directory name
- System requirements for Windows OS changed: A certain patch level is needed in order to use the applications (see User Manual for details)
- AutoCoverage functions is now included automatically if AMT option is activated. It will work in configuration with only one receiver.
- Added various new modem lists for specific use cases

#### GUI

- Stations-View completely removed and replaced with the new Frequency-View
  - Frequencies from Frequency-View can be displayed as overlay in spectrograms in the Wideband-Input, ResultViewer Signal-View and in the Result Viewer Time/Frequency display
  - Displaying matching frequencies for one result in ResultViewer/Detail added
  - New list of frequency ranges and a new demo database with HF frequencies (Klingenfuss 2018, 8-10MHz) are now included
  - New "Select all/Unselect all" options in all Multiselect-Comboboxes (Advanced filter, Frequency overlays etc)
  - Entering frequency restrictions in AutoMon-Wizard is not mandatory anymore
  - Signal file import function added to import external signals to the result database
  - Removed 3MHz Bandwidth limitation for file/stream input. Instead, the actual input speed is measured and it is reported if it is not sufficient, i.e. is less than realtime
  - Added check for max number of modems selected in a Narrowband processing AutoMon task. Also, a performance warning is issued if more than 20 modems have been selected for this task type to prevent suboptimal usage.
  - Map display component updated to the latest Marble version. Displaying overlays with custom placemarks is now possible
  - Improved GUI performance in case a decoder delivers decoder results with high data rates (for example for TETRA or DMR decoders)
  - Removed obsolete Decoder result display function "Text only"
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- Automatic parametrization of audio demodulator takes also the modem recognition result into account (until now only classification result). For example, if APCO-25 is recognized, "Digital codec" audio output will be turned on.
- Improved performance for displaying other results as overlay rectangles in the ResultViewer, Signal-View
- Simplified usage of audio player for demodulated audio files in ResultViewer
- Improved Advanced filter layout by adding collapsible frames for each filter group
- Improved AutoMon-Wizard, Modulation type trigger layout by adding vertical scrollbars
- Improved Frequencies-View performance for imports/deletes/group membership (2-3x faster)
- New parameter added for StreamSources.conf entries to decide if streams will be delivered through GUI or directly from streaming source to the components
- Improved validity check for time activation ranges in AutoMon Wizard

## APC

- Inclusion of patented vocoders from DVSI: improved voice output quality for APCO25, DMR, dPMR and NXDN
- SSB signals are reported as such in APC results (instead of USB/LSB)
- OQPSK demodulator: improved synchronization and symbol handling
- FSK4 demodulator: extended range of automatic frequency offset correction
- Improved demodulation performance of NXDN signals
- New detector for:
  - o Robust Packet modems
  - o Several OFDM-based CIS variants including CIS-45, CIS-112, CIS-128
  - o STANAG 4285: added KG-84 encryption detection
- New decoder for:
  - o INMARSAT-C-TDM
  - o CIS-12 PSK4B
  - o MFSK-32
- Extended decoder for
  - o Codan 3212 PSK single channel: 75, 2400 and 3600 bps modes supported
  - o APCO25: now also showing the manufacturer ID
  - o Morse: added Cyrillic alphabet (output in decoder channel 2)
  - o Motorola SmartNet: added modem for signals with 4 kHz shift
- support for FM-modulated USB/LSB voice signal with nominal offset (e.g. "FM2" or voice inversion and FDM signals)
- DDL performance improvements for commands using the Viterbi algorithm
- Modems with invalid nominal frequency were not activated on input bandwidth change
- Fixed calculation of FSK2 energy scheme to avoid exclusion of some FSK2 signals (e.g. POCSAG 512 Bd)
- STANAG 4415: correctly stop production on signal end
- System3000: reduce false-positive detection
- Panther H: reduce false-positive detection
- Tetra DMO: avoid runtime error for signal with poor quality
- HFDC: more CPDLC keywords ("IMIs")
- CPDLC: fixed rounding in output of position data, UM163 fixed
- Motorola SmartNet: added another dialect
- Voice J3E /ICAO: allow production of audio files in manual production mode
- INMARSAT-Aero: adjusted to improved OQPSK demodulator

## Receiver support:

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- New Receiver-Plugin Framework to enable integrators to develop support for new receivers including multichannel feature, overview spectrum, receiver control,...
- NetSDR receiver support added
- Narda SignalShark support added
- WinRadio G35 DDC receiver support added
- Added support for defining effective bandwidth for ExtIO receivers in the receiver template (already added for RTL-Stick, SDRPlay)

### BCU/BDU/HDU

- New ACARS Modem Detection
- Added support for customer defined adaptive modem definitions (see Pactor example)
- PSK classification now supports classification of signals with up to 200 kHz bandwidth
- More uniform processing interval lengths

### NCU

- Removed support for real-valued WAVE files
- Fix rare application stalls under high CPU load
- Revised Command Line Interface

### Remote Control interface, Integrators

- Changed TCP ports used for communication **with the Host** or between components:
  - o **Main CMAS (as\_controller) control port 51811 -> 36811!**
  - o SignalServer control port: 51814->36814
  - o RCM control ports, 60000->36940, 60100->36950
  - o RCM streaming ports: Range 61001-... -> 36400-...
  - o APC-Controller control port: 51812->31812 (All APC ports moved correspondingly with -10000 offset)
  - o For other internal port assignment, see ICD
- New Remote Control functions for easy-to-use implementation of streaming signals I/O
- Some field names changed without losing binary compatibility (FLD\_IFSTREAM\_IP\_ADDRESS, FLD\_IFSTREAM\_IP\_PORT)
- MSG\_IF\_STREAM message extended to support new capabilities and renamed in MSG\_SIGNAL\_STREAM (name change only, binary compatible)
- Changed cardinality for FLD\_USE\_TASK\_ID in IF-Server Task-Info message
- Added new SignalInput type, "UDP"
- Changed behavior if FLD\_APC\_ID is missing in MSG\_TASK\_ADD for production tasks. Instead of taking the first object, the system will take the object with the most free resources (channels)
- New example, "OfflineAPC", to demonstrate the usage of APC functionality from a command-line interface

### Bugfixes

- Fixed problems with running tasks if the IF-Server is almost full and no old data can be deleted. IF-Server will now stop all depending tasks in order to be able to free the storage space.
  - Fixed problem with IZT R3xxx receiver control with frequencies >2.4GHz
  - Fixed problem with zoom-in/out in ResultViewer, Time-Frequency display, if it is 90-degrees rotated
  - Fixed problems with File-Import API command blocking the system in case of very big import files
  - Fixed problems with incomplete spectrogram display in ResultViewer, Signal-View
  - Fixed time-sync problems with audio player for demodulated audio files in ResultViewer
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- Problem with scripting editor when opening/closing editor without saving script
- Fixed problem with processing of very short files as a File signal input
- Problems with GUI freeze during audio output on some computers solved
- Modems not suitable for usage in auto mon tasks are now disabled in AutoMon Task-Wizard, depending on the selected action type (decoding only or modem search)
- Fixed problems with missing classification result in GUI, narrowband channel, if the selected processing bandwidth is exactly equal to the channel bandwidth.
- Fixed problems with exporting ResultViewer table to CSV if non-latin characters were included
- Fixed problem with updating object name in the Resource-View if it was changed in the system

**Included software components:**

- SSC
  - APC Controller
  - APC
  - SignalServer
  - BCU
  - RCM
  - GUI
  - ResultViewer
  - Database: v13
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## Version 17.2.1

Date 10.03.2018

### Features and improvements:

#### Bugfixes

- Fixed max. bandwidth license check if there are different max. license bandwidths for HF and VUHF
- Fixed GUI problem with using SignalServer running on different IP addresses
- Fixed problem with signal selection in a narrowband channel if channel bandwidth is reduced to be smaller than the signal selection
- If input bandwidth is higher than max license bandwidth, GUI will not switch to "None" input to allow user to switch to bandwidth back to the allowed one
- Fixed problems with Gain setting and IZT R3xxx receiver. In initial configuration, before gain was set from the GUI, WB-spectrogram performed AutoRange in regular intervals causing flickering effects.
- Fixed some issues with TCP connection monitoring
- Fixed negative frequency values in the APC result if parametrized frequency is > 2.4 GHz
- Fixed links in decoder result window (narrowband channel) if result storage is on a UNC path of the form [\\ip\path](#)
- Fixed restoring last used decoder in a narrowband channel, Decoding mode
- Fixed RCM crash on bandwidth change with some ExtIO receivers
- Fixed IZTR3xxx narrowband receiver template (ComInterface setting was missing)

#### Included software components:

SSC: v17.2.1  
APC Controller: v17.2.1  
APC: v17.2.1  
SignalServer: v17.2.1  
BCU: v17.2.1  
RCM: v17.2.1  
GUI: v17.2.1  
ResultViewer: v17.2.1  
Database: v11

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## Version 17.2.

Date 15.12.2017

### Features and improvements:

#### General

- New product option, Narrowband Classifier (NCU), providing classification functionality with a command-line interface
- New component, HDU (Hopper Detection Unit), providing detection of frequency-hopping signals
- New BCU role, BDU (Broadband Detection Unit = BCU-Light), providing fast energy detection without classification
- Wiras component (WB-Recording option) replaced completely with SignalServer WB-Recording
- Added new function for monitoring of all system components and restarts in case of problems
- Added support for AutoMon WB-Recordings with multiple wideband Signal Inputs

#### GUI

- Added support for grouping frequencies in user-defined groups
- Various properties added to frequencies, including the possibility for the user to add its own properties
- Separated frequency management from the management of frequency ranges
- In-place editing of properties for frequencies and frequency ranges
- Added resource usage statistics reports and display for all components(CPU und memory)
- ResultViewer detail view improved to update only if something really changed
- Improved Object/Class-Browser in Scripting Editor
- Improved spectrogram display in case of instable signal connection (signal gaps are shown instead of resetting)

#### APC

##### General

- increased maximum supported input sampling rate to 10 MHz

##### Demodulator

- GMSK demodulator improved for BT values less than 0.5

##### Decoder

- new decoder for
  - o CIS FSK 200/1000
  - o INMARSAT-C-TDMA
  - o Motorola Smartnet
  - o XPA
  - o XPA2

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- Merod 267 Bd
- STANAG 5066
  - implemented in STANAG 4285, STANAG 4529, STANAG 4539
  - postprocessing to retrieve email contents (HMTP and CFTP) and store as files
- new detector for
  - MIL 188-110C App.D (Wideband HF) 3/6/9/12/15/18/21/24 kHz
  - Japanese Slot Machine
  - DPRK PSK 150/300/600/1200 Bd (North Korean Diplo radio)
- CPDLC and ADS-C protocol
  - implemented in HF DL, ACARS, VDL2, INMARSAT-AERO
- INMARSAT-AERO P,R,T,C
  - complete decoding of data layers
- Tetrapol
  - complete decoding of data layers of up and downlink

#### **Receiver support:**

- Preliminary support for PLATH SIR 2115
- Added generic support for VITA49 receivers (must be configured for each receiver type separately)
- Added support for CommsAudit CA781 receiver (VITA49)

#### **BCU**

- DSB-SC classifier added
- Improved segmentation and reduced false positives in VUHF frequency range
- Improved behavior in performance critical situations. If energy detection is not fast enough, the signal is skipped but processing continues.
- Snapshot duration limited to the length of the input buffer (~8s in standard configuration)

#### **Remote Control interface, Integrators**

- RemoteControl: New functions for sending/receiving stream packets
- RemoteControl: New functions for system object to automatically start application instances, monitor them and restart if needed
- RemoteControl: New Object-Type OBJ\_TYPE\_WB\_RECORDER for using SignalServer for WB-recording only, without DDC channels
- Multiple APC-NG products or multiple objects of type OBJ\_TYPE\_APCP in one system can now be started on one computer (port parametrization needed).
- Port usage of APC-NG (APC channels) changed
- BCU (BDU) status message includes now optional FLD\_ERROR\_CODE/FLD\_ERROR\_TEXT fields to deliver "last known error" information, similar as SignalServer
- New field FLD\_CAN\_CLASSIFY in BCU status message to distinguish between BDU and BCU role
- New "Signal-generator" signal input added for testing purposes
- ICD improvements including small error corrections, rewording/restructuring and some additional explanations

#### **Bugfixes**

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- Fixed various problems with UTF-8 strings (paths etc.)
- Fixed problem with automatic deletion of User-Entries in result database
- Fixed modem matching for CHN 4+4 modem
- Fixed problems with wrong items in the FFT length selection in ResultViewer, Signal tab
- Fixed problems with missing MSG\_OBJ\_DELETED messages in case of system cleanup (MSG\_SYS\_CLEANUP)
- Fixed problem with wrong BCU snapshot mode setting (race condition)

**Included software components:**

SSC: v17.2.0  
APC Controller: v17.2.0  
APC: v17.2.0  
SignalServer: v17.2.0  
BCU: v17.2.0  
RCM: v17.2.0  
GUI: v17.2.0  
ResultViewer: v17.2.0  
Database: v11

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	<b>Version 17.1.1 (only APC-NG and Linux version)</b>	21-Nov-18	Page 13

## **Version 17.1.1 (only APC-NG and Linux version)**

Date 15.10.2017

### **Features and improvements:**

- Added support for new SIRPRO Streaming Format for APC-NG (used by Plath IF-Storage)

### **Bugfixes**

- Fixed several installation issues with the Linux version (missing maps, python scripts etc.)
  - Fixed formatting problem in StreamInput.conf
  - Removed obsolete Pattern column from ResultViewer
  - Fixed some issues with signal extraction in ResultViewer
  - Fixed some problems with processing duration in BCU scan mode
  - Fixed memory leaks and deadlocks in apc\_controller
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## Version 17.1

Date 23.06.2017

### Features and improvements:

- New receiver control concept with separate docking views for each receiver
- Panorama-Spectrum display based on spectra delivered from receivers (implemented for WiNRADiO G33/G39, EM100, IZT R3000 receivers)
- Using multiple wideband input channels from supported receivers (implemented for WiNRADiO G39 and IZT R3000)
- Added new function for extracting NB-signals from all recordings directly in ResultViewer
- Old "Recording Viewer" GUI replaced completely through ResultViewer functions
- Creating and editing user entries in ResultViewer
- Added selection and multi-selection of results in a Signal-Tab of the ResultViewer and various context sensitive functions for selected results
- Improved editing of values in ResultViewer, Detail-View. Time fields editing added, numerical values editing comfort improved
- Improved long recordings display in ResultViewer
- Faster WB-recordings display in ResultViewer if precomputed spectra available
- Added result type selection for "Show other results" option in ResultView, Signal-Tab
- Precomputed spectra are stored with WB-recordings from SignalServer for faster display
- FilePlayback options added: History, Playback-Speed and manual editing of center frequency
- Additional channel bandwidth added to narrowband channel bandwidth list, equal to the maximal bandwidth which can be extracted from the wideband input (only if less then max allowed channel bandwidth)
- Default raster for the channel raster option reduced from 1kHz to 100Hz
- Messaging performance-improvement for large systems with many BCU instances
- SignalServer wideband recording bandwidth is now limited by the license (default 1MHz, can be increased depending on hardware)
- SignalServer recordings are now splitted in max 2GB big WAV-files
- Added warnings if more than 200 modems are used in one production
- Double-click on a result in ResultViewer table opens its detail
- "Del" shortcut not used anymore for deleting items from ResultViewer's table
- Changed frequency axis display for real-values signal (0Hz is the leftmost frequency now)
- Added support for Codemeter copy protection

### APC/Decoders:

- Measurement of SNR, noise and signal power during production (optional)
- New demodulator for Pactor-4: all speed levels
- New decoders:
  - o Pactor-4
    - complete decoding of all speed levels
    - post-processing (decompression) of airmail/sailmail emissions (if possible)
  - o INMARSAT AERO-P (physical layer only)
  - o INMARSAT AERO-C (physical layer only)
  - o INMARSAT AERO-T (physical layer only)
  - o INMARSAT AERO-R (physical layer only)
  - o INMARSAT-C TDMA (detection only)
  - o Turkish Navy FSK (similar to STANAG 4481 FSK)
- DMR
  - o decoding of short messages

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- improved output of Manufacturer FID
- DMR Continuous
  - voice output
  - improved output of Manufacturer FID
  - faster detection
- POCSAG: added modem with shift of 6 kHz (default is 8-9 kHz)
- STANAG 4481 FSK: added detection of KG-84 encryption
- Pactor-I: decoding of Robust Connect bursts
- dPMR: decoding of short messages
- APCO-25: faster detection

#### **BCU:**

- Added FM-Broadcast classifier
- Added QAM classifier
- Added MCFSK classifier
- Added direct detection of following modems:
  - APCO-25
  - CODAN 3212 16 Channel PSK
  - CODAN 3012 16 Channel PSK
  - DMR
  - DMR Continuous
  - dPMR (limited)
  - D-STAR
  - MPT1327 1200Bd MSK
  - NXDN 2400 Bd (limited)
  - NXDN 4800 Bd (limited)
  - PACTOR II FEC (limited)
  - STANAG 4529
  - TETRA Uplink (limited)
- Improved Scan-Mode support for IZT receiver (continuous emission tracking in Scan mode)

#### **Receiver support:**

- Support for SIR 2110 receiver
- Support for thinkRF receiver
- Panorama-Spectrum and Scan-Spectrum implemented for R&S EM100
- Panorama-Spectrum and Scan-Spectrum support for IZT R3000
- Multichannel support for WiNRADiO G39
- Multichannel support for IZT R3000

#### **Remote Control interface:**

- Removed quality threshold parameter from Production task (Default 70% will always be used)
- Added new functions for extracting NB-signals from recordings (Offline-DDC)
- Added Production-Task parameter to turn on SNR calculation
- Changed BCU status in case of empty signal input (was TRANSLATION-> is now OK)
- Added some debugging tools in the package (as\_commander)

#### **Bugfixes:**

- Fixed splitting of long SignalServer WB-recordings in multiple files
  - Fixed problem with wrong area displayed zooming-in to a wideband spectrogram
  - Fixed problem with recording file name sometimes containing 0 instead of actual frequency
-

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- Fixed some problems with Narda receivers
- Fixed problem with last used modem not being saved in "Decoding" mode
- Fixed component crash in case of corrupted streaming signal
- Fixed component crash in case of wrong bandwidth in the streaming signal
- Fixed problem with applying GUI perspective to multiple wideband inputs configuration
- Fixed some memory leaks in RemoteControl API
- Fixed problem with closing Time/Frequency filter in ResultViewer
- Bandwidth for SIR Subband 1 and 40 changed to include the complete usable bandwidth (only if data is received directly by components and not through RCM)
- Fixed standard deviation calculation issues in BCU

**Included software components:**

SSC: v17.1.0  
APC Controller: v17.1.0  
APC: v17.1.0  
SignalServer: v17.1.0  
BCU: v17.1.0  
RCM: v17.1.0  
WiRAS: v17.1.0  
GUI: v17.1.0  
ResultViewer: v17.1.0  
Database: v9

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## Version 4.2.0

Date 21.12.2016

### Features and improvements:

- Automatic audio demodulator settings option added in real-time channel and in offline audio player
- New channel function to store symbols in a \*.REC file during decoding
- Maximal channel bandwidth increased from 50kHz to 300kHz
- "Activation by region" AutoMon function turned on by default in all configurations
- ResultViewer: String wildcards (\*) must be used explicitly. If wildcards are not used, equality operator will be used.
- Saving GUI properties/perspective improved
- IF-Server deletes data automatically if free space is less than 2% of the total free space (5% in old versions)
- "Delete lookups" option in ResultViewer to delete modem/modulation values used in corresponding combo-boxes in advanced filter and detail window
- Wideband recording will be deleted synchronized with deletions from the IFServer ("Delete all data" function and automatic deletion of old data )
- ResultViewer Detail-Window is updated with some delay to allow faster stepping through table items
- Improved modulation type information for production results display in Result Viewer ( for example, "Voice USB" instead of "Voice A3E/J3E")
- All product versions now use fast FCDDC algorithm for NB-signal extraction (previously used only with SignalServer's 32ch option)
- Searching explicitly for one-channel emissions in ResultView now possible

### APC

- Modem search mode switched from "search first" to "search best"
- Added special mode to FSK2 matched demodulator for asynchronous Baudot signals
- New demodulator for Chirp signals
- Significantly increased demodulation quality and frequency stability of (G)MSK demodulator
- New decoder for Contestia
- POCSAG: automatically switch to alphanumeric or numeric output format; this is important for senders that do not follow strictly the standard protocol. Added timestamp to output
- DMR: significantly improved quality of voice output
- Flex: added timestamp to output
- Use automatic gain control (AGC) for NF recordings of FM Voice

### Receiver support

- New receivers added:
    - NARDA NRA-6000 / IDA 2
    - IZT SignalSuite R4000
    - AirSpy (experimental)
  - Changed handling of sub-bands 1 and 40 for SIR 511x: Bandwidth increased to cover the complete used bandwidth
-

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### Remote-Control Interface

- Some missing fields added to the ICD
- ICD formatting improved
- ICD text/descriptions improved
- Changed parametrization for symbol storage in production tasks (removed obsolete streaming function)
- Added `-conf` parameter for all applications to use custom configuration files
- Preliminary HDU interface description updated
- Improved RemoteControl library examples

### Bugfixes

- Problems after hibernation/stand-by mode fixed
- Prevented result detail docking windows closing with Alt+F4
- Continuous recording was sometimes overwriting its recordings instead of creating new ones
- BCU crash in case of invalid SignalInput fixed
- Dragging Audio cursor in ResultViewer, Content Tab, fixed
- Spectrogram refresh rate in narrowband channel was not sufficient for smooth scrolling
- Fixed problems if signal selection in channel is outside of the channel bandwidth (for classification and production)
- SI-FEC: avoid recognition in case of arbitrary idle sequences
- Pactor: avoid runtime error when decoder output time is limited
- CIS-14: less false positive detection
- PACTOR FEC: fixed usage of Huffman alphabet to get better output
- CODAN 3212 1 channel PSK: avoid runtime error

### Included software components:

SSC: v4.2.0  
APC Controller: v6.2.0  
APC: v6.2.0  
SignalServer: v4.2.0  
BCU: v4.2.0  
RCM: v2.3.0  
WiRAS: v4.2.0  
GUI: v4.2.0  
ResultViewer: v4.2.0  
Database: v9

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## Version 4.1.5

Date 30.09.2016

### Features and improvements:

- Support for management of sender and system positions:
  - System position can be defined and attached to all results
  - Sender-position can be defined/retrieved and displayed for all results (detail and overview displays in ResultViewer)
  - Filtering based on Sender or System position added in ResultViewer
- Receiver configuration (adding, removing, configuring, testing) can be done comfortably by using a graphical user interface
- Dynamic masking of results in ResultViewer based on Frequency, Emission-ID or Nominal frequency
- Editing fields in ResultViewer is now possible for almost all result fields
- Nominal frequency rounding to customizable values
- Editing frequency entries in AutoMon TaskWizard added
- Frequency names from AutoMon task definition will be inserted in AutoMon results for matching frequencies (new field "Frequency name" in all results added)
- Automatic splitting of long recordings in manual mode (256MB file size, configurable)
- Task/Mission fields in Advanced filter use lookup dropdown
- Selection between frequency search and "exact frequency" mode during decoding in manual-mode channel added
- Tooltip in Task-Activity window is now shown only on first table column
- Performance optimization for GUI displays in case many receivers or system components are used in a complex system
- Support for IZT R3xxx SYNC option (RCM, custom configuration needed)
- "Open as signal input" ResultViewer function switches automatically to File signal input

### BCU

- ASK 2/4 classifier added (UHF only)
- Improved Pactor4 modem detection with additional modes
- Improved detection of OTH Radar signals

### Remote-Control Interface:

- Complete redesign of the ICD document
- XML-based message descriptions added ("interface" subdirectory)

### Bugfixes:

- Some problems with stopping slow queries in ResultViewer fixed
  - BCU: Fixed some problems with modem exclusion (CIS-12)
  - Fixed reducing of BCU recognition rate after frequency change
  - Fixed problems in decoding mode in manual-mode processing channel
-

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- Fixed problem with detection of some modems with nominal frequency offset in decoding mode in manual-mode processing channels
- Fixed some problems with continuous recording function

**Included software components:**

SSC: v4.1.5  
APC Controller: v6.1.5  
APC: v6.1.0  
SignalServer: v4.1.5  
BCU: v4.1.5  
RCM: v2.2.0  
WiRAS: v4.1.5  
GUI: v4.1.5  
ResultViewer: v4.1.5  
Database: v9

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## **Version 4.1.1**

Date 23.08.2016

### **Bugfixes:**

- SSC: Fix blocking after cleanup message
- BCU: Fix a bug where emissions outside of a job scenario never get finished
- BCU: Use tone duration instead of baudrate for multitone
- BCU: Fix mix-up between MC-PSK/OFDM and FSK
- BCU: Fix FSK2 detection when emission bandwidth << channel bandwidth
- BCU: Fix problem with reduced classification rate after frequency change

### **Included software components:**

SSC: v4.1.1  
APC Controller: v6.1.1  
APC: v6.1.0  
SignalServer: v4.1.1  
BCU: v4.1.1  
Database: v7

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## Version 4.1.0

Date 30.06.2016

### Features and improvements:

- New function for storing and reusing ResultViewer filters
- Using relative time ranges in Time/Frequency filter in ResultViewer
- Various advanced options added to AutoMon (Blocking frequencies globally or for task only, Lead time selection...)
- Script-Based system actions (option)
- Script-Based context sensitive actions in ResultViewer
- Offline Audio demodulator and player in ResultViewer
- Global blocked frequency list in AutoMon
- Task/Mission Export/Import function for AutoMon
- Multiple selection in ResultViewer
- User-defined shortcuts in ResultViewer
- Decoder-Text is stored in the database to enable fast search
- Using multiple columns for sorting in ResultViewer table
- Export and Delete functions in ResultViewer improved (progress bar, can be interrupted by the user)
- Improved update behavior in ResultViewer if result has changed (no complete update, visual indication only)
- Improved performance of Tasks/Missions deletion (results will not be deleted automatically anymore)
- Improved matching between results and recordings in ResultViewer
- New ResultViewer option: „Show all results for each matching emissions“
- AutoMon Mission APC production mode can be selected (Offline/Realtime)
- ResultViewer can now be used as a standalone application (license-dependent)
- Added antenna information in the database and AutoMon (optional, custom configuration needed)
- Nominal frequency information delivered from BCU and APC are stored in database
- Added separate display for channels 2-4 of the decoder output
- Result data is not automatically retrieved in ResultViewer upon start. The user has to apply filter explicitly
- Keyboard shortcuts available only on wideband spectrogram, not on channel spectrograms
- German version of the GUI available
- Receiver configuration changed: no commenting of XML parts anymore, active flag for receivers added
- Added Plath SIR receiver configuration

### APC

#### General

- XML result output is completely encoded as UTF-8; charset command from decoder to switch encoding is handled internally
-

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- added information about burst start and end time from demodulator (only if burstmode is enabled) or decoder (if DDL command is sent) to production results

#### **Modems**

- added DSC-HF with shift of 500 Hz
- added Olivia 8/250 and Olivia 16/500
- corrected value for offset nominal frequency of several modems

#### **Decoders**

- Pactor II: soft decision implemented to improve output quality
- HF DL: support for PSK4

New decoder for

- Throb and ThrobX
- MT63
- Autocab
- Voice A3E Air Traffic
- Clansman

New detector for

- Thales System 3000 Skymaster Selcall
- Panther-H start sequence bursts

#### **BCU**

- OFDM classifier added
- PSK16 classifier added
- MSK/GMSK classifier added
- Tetrapol modem recognition
- Improved segmentation in VUHF frequency range

#### **Remote-Control Interface:**

- Generic objects (external applications) can be added to a go2MONITOR/CMAS2000 system and monitored
- Added Antenna information in SignalInput activation message
- Added nominal frequency fields in modulation types chapter
- Added scheduling-related commands
- Added support for digital audio streaming from APC
- Minor document corrections regarding field types and optional flag

#### **Bugfixes:**

- Data loss and performance problems with using WinRadio receivers fixed
  - Errors with using Zoom-out in ResultViewer fixed
  - Fixed problem with storing some special characters in the MySql Database
  - Resource problems after restarting single APC channels fixed
  - GUI behavior in Viewer mode with multiple active signal inputs fixed
  - Fixed problem with running go2MONITOR/CMAS2000 in parallel with PROCEED
  - Problems with streaming signal in loop from DANA fixed
  - Fixed crash when deleting all data from the database
  - Fixed problems with using network paths beginning with "\\\" in system installations
-

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- Fixed some problems with wideband recording reliability
- BCU memory leak in some system configurations fixed
- Fixed problem with BCU emissions with large bandwidth fluctuations
- Fixed problem with falsely reporting variable burst type for some BCU signals
- APC: PSK63-FEC: less false positive detection
- APC: PSK31-FEC: less false positive detection
- APC: PMR: error correction improved
- APC: STANAG 4415: avoid recognition of STANAG 4539 signals
- APC: STANAG 4529: less false positive detection
- APC: STANAG 4481 FSK: less false positive detection
- APC: HFDL: output of all LPDUs
- APC: ALE-3G: output of '@' character was missing
- APC: Voice A3E: avoid detection if carrier is not within parametrized frequency search range

**Included software components:**

SSC: v4.1.0  
APC Controller: v6.1.0  
APC: v6.1.0  
SignalServer: v4.1.0  
BCU: v4.1.0  
RCM: v2.1.0  
WiRAS: v4.1.0  
GUI: v4.1.0  
ResultViewer: v4.1.0  
Database: v7

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## Version 3.2.1

Date 08.03.2016

### Bugfixes:

- **BCU:** fixed memory leak in case of high cpu load
- **GUI:** Fixed decoder text display with alternative charsets (Arabic, Cyrillic)
- **GUI, SignalServer:** Fixed several issues for using IZT receiver as NB-receiver
- **AutoMon:** Fixed some usability problem when using NB-receivers
- **GUI:** Fixed problem with all system applications still running after GUI has been closed
- **GUI:** Fixed problem with matching wrong recordings to a result in ResultViewer
- **GUI:** Fixed memory leak in Resource view
- **BCU:** Improved performance by fixing some time synchronization problems
- **APC:** Fixed some problems with forwarding recording files to production tasks in AutoMon (lost results)
- **BCU:** Fixed some problems with delivering spectrum in scan mode
- **AutoMon:** Daily from-to task activation fixed
- **AutoMon:** Various problems with parallel usage of software DDCs and NB-receivers fixed

### Improvements:

- **SignalServer:** Obsolete TXT files are not stored for each WAV file anymore
- **BCU:** Improved modem matching algorithm for multi-tone and MCPSK emissions
- **SignalServer:** Added --log\_suffix command-line option to enable using multiple SignalServers on one computer
- **SSC:** Added --addinstance command-line option to enable using multiple SSCs on one computer
- **SignalServer:** Emission IDs for narrowband classification emissions are now unique
- **GUI:** Storage-Server status (oldest data and free space) are updated in regular intervals

### Included software components:

SSC: v3.2.1  
APC Controller: v5.2.1  
APC: v5.2.0  
SignalServer: v3.2.1  
BCU: v3.2.1  
RCM: v2.0.1  
WiRAS: v3.2.1  
GUI: v3.2.1

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## Version 3.2.0

Date 03.02.2016

### Features:

- Support for multichannel digital-audio output (APC-based, see PMR modem list for supported modems)
- New function for setting/querying/filtering result flags
- New Structuring-View in ResultViewer for script-based result structuring
- Direct SQL usage to extend ResultViewer filter
- Support for creation of Python scripts for different contexts (GUI Automation, Results structuring,...)
- Improved Resource View performance for complex system configurations
- Added Emission-ID field in the result database to enable grouping of all results created from one AutoMon trigger
- ChannelDistance field added to result database
- Added "Maximize Spectrogram" function
- Minimal required modem bandwidth is taken into account when determining DDC channel bandwidth in AutoMon
- Improved Idle-Signal detection speed in AutoMon

### APC

- New decoder for X6 Mazielka
- New decoder for ERMES
- New decoder for DSTAR (data and voice)
- DMR
  - add Trunked Mode (Tier III)
  - improved Tier I and II
  - error correction improved
  - voice output quality improved
- Pactor I:
  - enabled output of binary file
  - added option to stop modem after initial addressing
- Packet 300
  - output with ISO8859-15 Encoding
  - Hex output added (on channel 16)
  - force output if CRC is incorrect
- CIS 36-50
  - synchronization improved
- Output of sync and session key
- Improved APC restarting process: only single APCs will be restarted in case of a problem

### BCU

- TETRA modem classification added (license-dependent)
  - Performance improvement of ~30-40% in the modulation classification process
-

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- Improved emission splitting in some cases (VUHF)
- Improved FSK2 symbol-rate calculation in case of asynchronous FSK
- Improved modem matching tolerances for multitone emissions (determining positive/negative modem lists)
- Using bandwidth outside of declared receiver bandwidth for SIR receiver added
- Configuration of separate max. bandwidth limits for different classifiers and different frequency ranges (integration setting for custom setups only)

### **Remote-Control Interface:**

- Simplified ICD description of audio streaming format. Some audio-related field names changed (same IDs – backward compatible)

### **Bugfixes:**

- Fixed problem with broken TCP connections when using SignalServer channels
- Some cases of modulation change in a single BCU emission fixed
- Fixed problem with minimizing AdvancedFilter and restoring its position
- Channel raster should is not applied if emission was dragged 'n dropped from Classification/Station-views
- Fixed several issues affecting configurations with NB-receivers only (without Software-DDCs)
- POCSAG recognition: shift tolerance increased
- Less false-positive recognitions: FEC-A, PSK31, PSK31-FEC, LINK11 CLEW, DGPS, PSK63, QPSK31
- PSK250: no output in case of idle sequences
- Link-11 SLEW: channel bandwidth was too large which could cause erroneous measurement of center frequency

### **Included software components:**

SSC: v3.2.0  
APC Controller: v5.2.0  
APC: v5.2.0  
SignalServer: v3.2.0  
BCU: v3.2.0  
RCM: v2.0.0  
WiRAS: v3.2.0  
GUI: v3.2.0

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## Version 3.1.3

Date 17.11.2015

### Bugfixes:

- **APC:** Improved stability, fixed crashes with Voice FM modems
- **APC:** SELCAL DTMF modem removed from modem list (obsolete)
- **BCU:** Modem exclusion for ACARS modem optimized
- **BCU:** Negative quality values for FSK classifier fixed
- **BCU:** Raster for noise level calculation in VUHF changed from 20MHz to 2MHz
- **SignalServer:** Fixed 100% CPU load in configurations with EM100 receiver
- **SignalServer:** Max Delay for DDC is now determined based on conf-settings
- **SignalServer:** Fixed some mismatches between ICD and actual SignalServer messages
- **GUI/SignalServer:** Current SignalServer bandwidth was not displayed in the GUI
- **GUI:** Fixed phantom columns in ResultView in case of empty result table
- **GUI:** Fixed problems with mismatch between spectrum display time and emission markers
- **GUI:** Some issues with activating/deactivating AutoMon Tasks and Missions fixed
- **ICD:** Structure changed, Preliminary interfaces for HDU/BDU components added, obsolete RT-APCP Production task type removed, some typing errors fixed

### Included software components:

SSC: v3.1.3  
APC Controller: v5.1.3  
APC: v5.1.1  
SignalServer: v3.1.3  
BCU: v3.1.3  
RCM: v1.9.2  
WiRAS: v3.1.3  
GUI: v3.1.3

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## **Version 3.1.2**

Date 28.10.2015

### **Bugfixes:**

- **BCU:** Fixed problem with blocked frequencies if signal time is not near the current local time
- **BCU:** Fixed problems with SIR-receiver and Multicast
- **BCU/SignalServer:** Reduced CPU load with SIR-receiver

### **Included software components:**

SSC: v3.1.2  
APC Controller: v5.1.2  
APC: v5.1.1  
SignalServer: v3.1.2  
BCU: v3.1.2  
RCM: v1.9.2  
WiRAS: v3.1.2  
GUI: v3.1.2

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## **Version 3.1.1**

Date 23.09.2015

### **Bugfixes:**

- **GUI:** Checking maximal File/Stream input bandwidth in the GUI fixed
- **GUI:** Fixed Spectrogram problems in Scan-Mode
- **GUI:** Fixed problems with black stripes on spectrogram edge for some frequencies
- **GUI:** Fixed AutoRange problems with Spectrogram if effective bandwidth is less than full bandwidth
- **GUI:** Fixed problems with frequency range display for BCU & SignalServer
- **AutoMon:** Fixed some problems in AutoMon if APCs are running in Offline-Mode. Single APC channels were blocked occasionally and could be fixed only by mode change
- **BCU:** Some problems with Link-11 Modem detection fixed. Recognition rate will be slightly higher now

### **Included software components:**

SSC: v3.1.1  
APC Controller: v5.1.1  
APC: v5.1.0  
SignalServer: v3.1.1  
BCU: v3.1.1  
RCM: v1.9.1  
WiRAS: v3.1.1  
GUI: v3.1.1

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## Version 3.1.0

Date 28.08.2015

### Features:

#### GUI

- Support for multiple Wideband Signal-Inputs (optional)
  - New Main-Window toolbar structure
  - Wideband-Input windows can be tiled or tabbed
  - Usage of multiple WB-Inputs in all views: NB-Channels, WB-Classification, AutoMon
- File-Playlists can be used for File-Input
- Support for Perspectives (docking window configurations). User can apply predefined perspectives or create his own perspectives
- Modem name displayed in spectrogram instead of modulation type (if available)
- Performance display for Wideband Classifier added (BCU)
- If modem is recognized in the BCU, its name will be shown in the spectrogram instead of modulation name

#### AutoMon

- Support for filtering based on positive or negative modem lists from classifier
- Added emission duration and emission bandwidth ranges in trigger
- Changed AutoMon Task-Wizard flow. Energy-trigger page will always be shown
- Task summary added as a tooltip in the TaskActivity window

#### APC

- Added support for AMBE codec
  - Added AGC to vocoder framework
  - XML result output improved ( see PROCITEC-ICD-APC\_Results-E document)
  - Improved modem recognition and production for very short signals recordings (<10s)
  - DMR decoder
    - Direct production of audio output in WAV file format
    - New decoder for continuous signals
  - NXDN: direct production of audio output in WAV file format
  - dPMR: direct production of audio output in WAV file format
  - Tetra: using vocoder framework
  - New decoder for BIIS
  - Baudot async:
    - Improved detection in case of idle sequences
    - Support for Arabic Baghdad-70 and Baghdad-80
-

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- Alphabet (latin, cyrillic, arabic, hebrew) can be set in modem description (decoder parameter)

## BCU

- Detection of some OTH-Radar classes added
- Reduced emission splitting for Voice USB/LSB emissions
- Sweeper detection improved
- Added Pactor4 modem detection in wideband classification
- Added Link11 (CLEW and SLEW) modem detection in wideband classification
- Improved splitting of close signals by using classification results
- Status report changed. In case input signal is not provided, BCU switches to "Transition state" (similarly as SignalServer)
- Pattern matching function turned off by default (replaced by modem detection)

## SignalServer

- Improved dynamic range for DDCs to >120dB
- Performance improvement for installations with more than 100 channels

## Receiver support

- Added Winradio G33DDC
- Optional support for Plath SIR 5110 receiver added
- Simplified system configuration for integrators -> no SystemConfiguration.xml editing in case of new NB-receivers

## Remote-Control Interface:

- Removed all interface parts related to FEP component (not used anymore, replaced by SignalServer)
- Added new Modem types recognized by the BCU and new table for the list of all modem types/parameters
- FLD\_CLASSIFICATION\_MODEM field renamed in FLD\_MODULATION\_TYPE (same IDs, no compatibility problems)
- Streaming format for SignalServer is now new ExtA streaming format (see PROCITEC-DSC-IF\_DataStream\_ExtA document)
- Updated APC result format ( see PROCITEC-ICD-APC\_Results-E document)
- Updated WAV custom chunk format ( see PROCITEC-DSC-Fileformats\_WAV-E document)

## Other

- Component names changed: decoder.exe -> apc.exe, receiver.exe-> rcm.exe
- Parameterization of control ports for all components (manual configuration changes needed)

## Included software components:

SSC: v3.1.0

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APC Controller: v5.1.0

APC: v5.1.0

SignalServer: v3.1.0

BCU: v3.1.0

RCM: v1.9.0

WiRAS: v3.1.0

GUI: v3.1.0

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## Version 2.2.0

Date 29.01.2015

### Features:

- BCU: Direct modem recognition in wideband and narrowband classification added. Currently supported modems categories are:
  - STANAG 4285/4481 (PSK)\*
  - STANAG 4529\*
  - MIL-STD-188-110A Serial (single-tone) mode\*
  - HFDL

\*only if MIL Decoder package is available

Modem recognition results are visible in all classification result displays: ResultViewer, Emission list and narrowband channel.

- BCU: Emission detection and classification quality improved. BCU delivers much less False-Positives than in the last version
  - BCU: Performance improved on installations with many available cores (manual optimizations of configuration files needed)
  - GUI: In AutoMon Wizard, it is now possible to use modem lists for selecting trigger or production modems
  - GUI: AutoMon Wizard layout changed to allow faster trigger selection and action types
  - GUI: FFT-length can be changed in Spectrogram-Preview in Result-Viewer
  - GUI: Result display in Result-Viewer optimized for very large databases
  - GUI: Development of custom user functions with Python programming language (available as option or on request)
  - GUI: In table view of the ResultViewer, it is possible to turn off table sorting to improve performance with large databases
  - GUI: All manuals are now available directly from the main menu
  - GUI: Negative search in ResultView for text fields ("NOT Morse")
  - GUI: Pause in spectrogram also pauses Emissions table
  - GUI: Duration fields display in ResultViewer now include milliseconds
  - GUI: Changed registry key for settings storage (domain extension removed from registry key name)
  - GUI: Burst information displayed in the classification result in a processing channel
  - New product option for the usage of many software-based DDC channels ("32-channel option"). This option can be used only if hardware requirements have been met and will typically be installed through custom setup.
  - In combination with "32-channel option", it is possible to use offline modem recognition and decoding in AutoMon. Many DDC channels record signals of interest in files and trigger APC production. These signal files are processed by available APC channels in background, much faster than realtime (depending on license). This allows for high-performance setup with many DDC channels and high bandwidth coverage. This option can be used only if hardware requirements have been met and will typically be installed through custom setup.
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- AutoMon: User-Configurable Frequency-Step option for AutoCoverage. User can set the bandwidth and dwell-time for stepping through frequency range interactively (available as option).
- WinRadio G31/G39 receiver: Added support for using multiple receivers on one computer
- API: New system mode, MODE\_SUBSYSTEM added. It is used in configurations without GUI if the system is controlled by external Host (see ICD for details)
- API: Changed version field format (see ICD for details)
- API: SignalServer DDC channel control improved (see ICD for details)
- Minimal bandwidth for channels used in AutoMon set to 5kHz (2kHz channel will not be used in AutoMon anymore)
- Added tracking of "Nothing to do" action in Task activity View in AutoMon (Production action where all modems have been filtered by the BCU)

### Modem changes:

- STANAG 4539 HDR, soft decision and equalizer implemented which improves result quality enormously
- Use preamble symbols for burst detection in HF DL, STANAG 4539 HDR, STANAG 5511 SLEW
- STANAG 4285, report decoding progress in case alphabet detection takes longer than 15 seconds of signal time
- APCO-25, direct production of audio output in WAV file format
- PACTOR 4 detector for speed modes 2-10
- Voice, crosscheck detected nominal frequency with parametrised frequency range to further reduce false positives
- CODAN 3012/3212 16 channel PSK: take advantage of known preamble to improve burst detection noticeably
- HF DL, recognition of short bursts improved
- STANAG-4481-FSK, STANAG-4481-PSK, STANAG-4415, STANAG-4539: added some more modes
- CODAN Chirp: minor improvement of demodulation quality
- ALE-2G: moved from premium to standard HF decoder list
- Tetra: support for SDS text messages
- HF DL: soft decision implemented
- New decoders for
  - Tetra DMO
  - CV-786
  - CHN 4+4: production (was detector only)
  - ALE-400
  - ALE-3G (STANAG 4538): production for BW0,1,2,4,5,6; only detection for BW3
- Some modem names have been changed. See DecoderList.pdf for details.

### Bugfixes:

- GUI: Table export from ResultViewer, column format fixed
  - GUI: Signal source update in status bar fixed
  - GUI: Lookup-Editor, adding new items fixed
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- SignalServer: Some problems with channel adding fixed
- Stations View: Number of stations reported during import or export was wrong
- GUI, Spectrogram: "Zoom-out to Max. frequency" and time has caused spectrogram to flow much faster. Fixed.
- GUI: Move function in spectrogram did not work. Fixed.
- ResultViewer: Production-Result bandwidth fixed
- ResultViewer: Matching between APC results and recordings improved
- ResultViewer: Negative duration for some production results fixed
- ResultViewer: Channel count for classified emissions was not displayed. Fixed.
- BCU: Problem with fast snapshot classifications one after another fixed
- APC: In manual mode, APC was frequently much slower than realtime if the modem list was very long. This is fixed so that APC keeps the realtime speed in manual mode (max delay of ~20s)
- APC: XML Results, corrected timestamp reported for production end
- APC: AIS modem, fixed formatting and measurement units
- APC: MIL\_STD\_188\_110B\_39Tone, STANAG-4285, STANAG-4529: output text contained duplicates
- APC: Pactor 2, Pactor 3, do not suppress repeated frames if CRC is OK
- AutoMon: Fixed problems with channel delay (PC-time dependency)
- AutoMon: Problems with simultaneous WB-Recordings fixed
- BCU: Modem exclusion for Voice modem fixed (many false exclusions)
- BCU: No emission splitting if modulation remains the same, but only modulation parameter change
- BCU: Problems with time management during result merge process fixed
- BCU: Crash with corrupted patterns in modems fixed
- Problems with fast frequency change with SDR-14 receiver fixed
- Spectrogram Settings View was not visible in Auto-Mode. Fixed.
- Fixed problem with saving settings in a wrong regkey from the GUI
- API: Version information was sometimes empty (0). Fixed.

### **Included software components:**

SSC: v2.2.0  
APC Controller: v2.2.0  
APC: v4.2.0  
SignalServer: v1.2.0  
BCU: v2.3.1  
RCM: v1.7.0  
WiRAS: v2.8.0  
GUI: v2.2.0

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## **Version 2.1.1**

Date 12.06.2014

### **Features:**

- GUI: Added keyboard shortcuts in Emission dock to process a selected emission directly in one of NB channels
- GUI,SignalServer,BCU: BCU's and SignalServer's current frequency range is displayed in the Ressource View

### **Bugfixes:**

- GUI: Fixed signal errors if File-Input is used with files >2.5MHz sampling rate
- APC Controller: Fixed occasional problem of the system not starting because APC is not yet running
- BCU: Fixed an error that could result in distorted signals when using the fast stepping mode
- BCU: Improvement for classification of short-time signals
- BCU: Fixed memory leaks in FSK and MFSK classifier

### **Included components:**

SSC: v2.1.1  
APC Controller: v2.1.1  
APC: v3.2.0  
SignalServer: v1.0.0  
BCU: v2.2.1  
RCM: v1.6.3  
WiRAS: v2.6.1  
GUI: v2.1.1

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## Version 2.1.0

Date 12.05.2014

### Features:

- GUI: Added automatic frequency coverage option in Task-based filter
- GUI: Wording in AutoMon changed: "Restriction"->"Activation"
- GUI: Changed Latitude/Longitude format from +/- to N/S/W/E format
- GUI: Multiple selection for "Frequencies" dock and in Task Wizard

### Bugfixes:

- GUI: Canceling during mission creation does not create new mission anymore
- GUI: Changing marker colors for modulation types works for all types now
- GUI: Immediate Mouse-Zoom Spectrogram option fixed
- GUI: Deleting all results from all pages works now in ResultViewer
- GUI: Fixed problem with displaying "[Empty]" for Detail tabs with content
- GUI: Frequency range for NB-channel based on NB-receivers now is taken from Capabilities for each receiver
- GUI: Fixed problem when looping back with real-valued WAV-files
- GUI: Deleting result in ResultViewer deletes all corresponding files as well
- BCU: Improved performance if multi-modems are used
- WIRAS: Improved stability if receiver is switching fast through frequency ranges

### Included components:

SSC: v2.1.0  
APC Controller: v2.1.0  
APC: v3.2.0  
SignalServer: v0.0.8  
BCU: v2.2.0  
RCM: v1.6.2  
WiRAS: v2.5.1  
GUI: v2.1.0

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## Version 2.0

Date 28.02.2014

- New product option: "Automatic Monitoring and Tasking"
  - New product option: "Automatic Frequency Coverage" (only if "Automatic Monitoring and Tasking" option is included).
  - New product option: "20 MHz Wideband Recording"
  - New product option: "20 MHz Wideband Classifier"
  - New product option : Support for scan/panorama spectrum in manual mode (only if "20 MHz Wideband Classifier" option is included)
  - Support for processing real-valued WAV-files
  - New module for management of custom frequencies or frequency ranges
  - All recordings are stored in the system storage – no need to choose location in GUI
  - Negative search implemented in the Result Window (show \* where X NOT LIKE Y)
  - Toolbar redesign
  - All applications except decoder.exe and receiver.exe are now 64-bit
  - Included is the latest Automatic Production Channel (APC, decoder.exe) component version, v3.2.0 (same as in v1.3)
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## Version 1.3

Date 20.11.2013

- New product option to directly use external NB-receivers as signal input for processing channels (in parallel with existing Software-DDC channels)
  - New product option to use database system for storing results (audio, decoder results, recordings). New ResultViewer GUI is provided for navigation through results and result display.
  - New modulation type supported in classifier: multichannel PSK (MC PSK)
  - Specific Modem list can be defined to be used as default list if modulation type could not be recognized in "Classification+Recognition+Decoding" mode
  - Specific Modem list can be defined to be used as master list for modem filtering in "Classification+Recognition+Decoding" mode
  - Resources window added to the GUI to show the current status and resource usage of all components
  - New receiver supported: WinRadio G39DDC
  - New or renamed modems:
    - apco-25
    - arq\_e3\_100bd\_400hz
    - arq\_e3\_50bd\_400hz
    - arq\_e\_cyc8\_96bd\_192hz
    - arq\_m2\_342\_200bd\_410hz
    - atis
    - baudot\_2stopbit\_75bd\_500hz
    - baudot\_async\_50bd\_170hz
    - baudot\_universal\_50bd\_650hz
    - cis-12\_psk2
    - codan3212\_16channel\_psk
    - dmr
    - dpmr
    - dtmf
    - dtmf\_fm
    - flex
    - flex\_1600bd\_psk2a
    - gw\_ofdm
    - md674
    - mobitex-1200
    - mobitex-8000
    - packet-1200
    - packet-1200\_sub
    - packet-300
    - packet-9600
    - pactor
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- sitor-b\_100bd\_170hz
  - voice\_a3e
  - voice\_a3e\_j3e
  - Voice\_F3E\_DTMF
  - voice\_j3e\_selcal\_icao
  
  - Removed modems:
    - arq\_e3\_cyc8\_50bd\_400hz
    - codan3012\_16channel\_psk
    - flex\_1600bd
    - md647
    - packet-300-4800
    - packet9600
    - voice\_selcal\_icao
  - New Modem Lists, "HF\_on\_air" and "VHF-UHF\_on\_air" containing only frequently used modems
  - Included the latest Automatic Production Channel (APC) component version, v3.2.0
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## **Version 1.2**

Date 01.03.2013

- Support for new receivers:
    - R&S EM100
    - RFspace SDR-14/IQ
    - IZT R3xxx
    - Grintek GRX Lan
    - WinRadio G331DDC
    - HDSDR ExtIO experimental support(for receiver setup instructions, see *ReceiverConfiguration* document)
  - Application Settings dialog with various user-settings for display, fonts and GUI behavior
  - New function for choosing effective bandwidth of the input file
  - Support for displaying results using alternative Alphabets (if supported by the decoder)
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## **Version 1.1**

Date 15 November 2012

- First released version