DOC236879EN-H

IRIS and RDA Release Notes

10.3.0

VAISALA

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1. About this document

1.1 Version information

Table 1 Document versions (English)

Document code	Date	Description
DOC236879-H	June 2025	Release Notes for IRIS and RDA 10.3.0.
DOC236879-G	February 2025	Release Notes for IRIS and RDA 10.2.0.
DOC236879-F	August 2024	Release Notes for IRIS and RDA 10.1.0. This release brings support for the RVP10 release 2.0.
DOC236879-E	February 2024	Release Notes for IRIS and RDA 10.0.1
DOC236879-D	June 2023	Release Notes for IRIS and RDA 10.0.0

1.2 Related documents

Table 2 Related documents (English)

Document code	Name
M212924EN	*IRIS and RDA Software Installation Guide*
M212925EN	*IRIS and RDA Utilities Guide*
M212926EN	*IRIS Radar User Guide*
M212927EN	*IRIS Programming Guide*
M212928EN	*IRIS Product and Display Guide*
M212923EN	*Radar Control Processor RCP8 User Guide*
M212604EN	*RVP10 Digital Receiver and Signal Processor User Guide*

2. IRIS and RDA 10.3.0 Release notes

10.3.0 release notes cover the changes made in IRIS and RDA since release 10.2.0 (February 2025).

If you have an earlier release than 10.2.0 and you are now installing 10.3.0, please also read the release notes for earlier releases to see all the information about changes between releases.

10.3.0 is built for AlmaLinux 9. Information for upgrading AlmaLinux from version 8 to version 9 is included in the documentation. See *IRIS and RDA Software Installation Guide (M212924EN)*, which includes instructions for upgrading AlmaLinux 8 to AlmaLinux 9, installing AlmaLinux 9 on a fresh system, and installing the application software.

2.1 Security enhancements

Vaisala has started the updates and processes for complying with the cyber security requirements for EN18031-1 Radio Equipment Directive (RED). The full compliance will be brought in a later release (planned for 10.4). The following lists the requirements completed for 10.3.

- Analysis of cyber security related to the weather radar servers, IFDR10, and other network equipment used in Vaisala weather radars
- CIS server hardening script run on AlmaLinux installation and added to the factory configuration image (with exclusion list)
- RPM repository signing tested
- Hardening of CAN-Ethernet device
- Ensuring that **`firewalld`** drops unnecessary services and ports: removed the **`cockpit`** and **`dhcpv6-client`** services
- Added to user documentation the information that NTP service is allowed through the radar server firewall

2.2 RDA release notes

2.2.1 RDA updates and new features

- RVP10 now provides the ability to change the pulse repetition frequency from within the **`dspx`** utility.
- RCP8 users can now set the 2nd local oscillator frequency through the **`antx`** utility for Vaisala WRS400 and WRS300 weather radars.
- Headroom extension configuration has been moved from **`Mp`** and into **`Mw`** sections of the **`dspx`** utility, which allows enabling the linearization headroom extension capability per transmit pulse/sequence definition.

- Added frequency control for GPIB signal generator.

2.2.2 RDA bug fixes

- WRSW-60: Missing burst pulse/Burst pulse misaligned. Several bugs causing real and false '`Burst Pulse Misaligned`' messages were fixed.
- WRSW-124: PS plot saves filter and waveform data to non-existent directory.
- WRSW-145: Add delay timer between polarization change and radiate on. This allows the addition of a delay timer to radiate on command when changing polarizations. The issue was that in some radar systems the signal paths would cause the trigger to arrive to the transmitter prior to polarization change, leading to interrupted triggers and over duty cycle faults.
- Fixed a number of bugs related to plots and displaying longer NLFM pulses in dspx.
- WRSW-323: IF linearization cannot be deselected only on NLFM pulses and kept on on CW pulses. The linearized saturation headroom extension feature is not valid for NLFM pulses. This change allows having this featured enabled per transmit waveform configuration.
- WRSW-325: No headroom extension for IQ0. Removed the linearized saturation headroom extension from IQ0 (Range Zero) which stores the measured burst pulse.
- WRSW-350: Linearized saturation headroom is not applied. In IRIS/RDA 10.2 the linearized saturation headroom extension was broken when performing zauto's.
- WRSW-351: `Ascope`: Trigger breaks when exiting help browser. When the user is in the `Ascope` utility and reviewing the online help documentation, closing the online help document caused an interruption to the transmitter triggers.
- WRSW-353: `Suncal` fails - overwrite IFDR angles with antenna libraries in IQ Main, add DSPX question. A bug related to antenna angle source within `Suncal` tasks.
- WRSW-415: `Suncal` fails - remove IRIS Setup source of angle question. A bug related to antenna angle source within `Suncal` tasks.
- WRSW-368: *`vaisala-iris-rda-install.sh`* script should support upgrades. The *`vaisala-iris-rda-install.sh`* script did not have an `--upgrade` option and needed to be executed with mounted directory as current path. Added arguments for upgrade and to define path.
- WRSW-381: Kvaser drivers issues. Fixed issues with claimed version number and names of this driver in the kernel module.
- WRSW-427: Fix `zauto autocal` upper range stepping. When using `autocal` in the `zauto` utility, the correct amplitude step size in the beginning of siggen upper range may not be correct depending on the location of the last step and step size in the center range. Also, the high limit value in upper range is not included in the range.
- WRSW-429: Fix issues in the *`vaisala-iris-rda-install.sh`* script for online/offline upgrade from IRIS/RDA-only ISO image. This bug prevented upgrading IRIS/RDA versions when not having the complete operating system ISO along with the IRIS/RDA rpms.
- WRSW-534: RVP10 service may start with failing memory sections. This bug could appear when starting RVP10 and IRIS at the same time. When the issue was encountered, measurement with IRIS tasks was not possible.

2.3 IRIS release notes

2.3.1 IRIS updates and new features

- The SRI algorithm at times was allowing virga to accumulate precipitation at the surface. An option was added in the IRIS `Setup` utility to revert a change implemented in IRIS RDA version 8.13.6. which introduced this issue.
- Embedded Linux on IFDR10 has been upgraded from the Kirkstone to the Scarthgap version.
- The architecture of the RVP10 IQ processing is being changed for future functional improvements. When performing `ps_iris` the RVP10 proc processes will no longer be listed.
- OR logic option was added to the WARN product configuration.

2.3.2 IRIS bug fixes

- WRSW-2: IRIS Analysis TDWR-LLWAS-INT service's WARN-receiving naming policy change. Changes the naming logic of WARN products produced for LLWAS integration to have unique file names so that they can be identified correctly by the receiving application.
- WRSW-141: Fix zero radial width some pipes are writing to IRIS RAW preventing IRIS Focus from data display.
- WRSW-372: Fix data converters dependency versions. Fixed rpm dependencies for the BMP and KML data convertors that prevented them being upgraded.
- WRSW-445: IRIS watchdog fails to restart crashed processes.

3. IRIS and RDA 10.2.0 Release notes

10.2.0 Release notes cover the changes made in IRIS and RDA since release 10.1.0 (August 2024).

If you have an earlier release than 10.1.0 and you are now installing 10.2.0, please also read the release notes for earlier releases to see all the information about changes between releases.

10.2.0 is built for AlmaLinux 9. Information for upgrading AlmaLinux from version 8 to version 9 is included in the documentation. See *IRIS and RDA Software Installation Guide (M212924EN)*, which includes instructions for upgrading AlmaLinux 8 to AlmaLinux 9, installing AlmaLinux 9 on a fresh system, and installing the application software.

3.1 RDA release notes

3.1.1 RDA updates and new features

- Support for wide dynamic range. RVP10 now has the ability to use a front-end receiver having high- and low-gain channels in each polarization state. The IQ's from these channels are merged together to extend the dynamic range in each polarization. The methodology is similar to the RVP8 signal processor.
- With this software release, RVP900 and RVP10 support Vaisala's new magnetron transmitter WRX122.
- The maximum number of range bins supported is now up to 15,000. Given the increase in processing power, the maximum number of range bins possible in any single radial has been increased from 8,192 to 15,000 for RVP10. This number is possible even with RVP10 at maximum load configuration, for example: 16 data types, GMAP, attenuation correction, real-time hydrometeor classification, 2,000 pulse repetition frequency, etc. This capability would allow a bin size resolution of 10 meters out to 150 km, which future-proofs the RVP10 for more advanced uses of SSPA waveforms.
- The RVP10 interface between the server and IFDR10 can now be configured to use jumbo frames.
- The RVP10 server software now ascertains the validity of user entries into the dspx menus using the same methods as the IFDR10 validating values being received from the server.

3.1.2 RDA bug fixes

- WRSW-9: Allow adjusting filter length independent from pulse length for matched filter. In the original implementation of the matched filter, the filter length and bandwidth are calculated from the pulse length. RVP10 was using the matched filter length to determine duty cycle, not the pulse length. However, some magnetron transmitters do not produce an ideal pulse where the users needed to insert longer pulse length information in order for the calculated filter bandwidth to match the bandwidth of the pulse. When doing so, this would wrongly reduce the maximum duty cycle allowed from the longer filter length. RVP10 now uses the pulse length information to calculate duty cycle.
- WRSW-10: Raw data call may stall FPGA with longer filters/Tx pulses. This was an edge case bug within the RVP10, possible when using NLFM pulse compression in SSPA radars.
- WRSW-39: IF level inaccuracy - Zauto power sampling and dspx/Pr plot. Within the dspx/Pr plot, the IQ's were not being scaled correctly and appeared to be at different power level when comparing the same signal power in ASCOPE.
- WRSW-48: Serious errors were detected in the previous CPI in hybrid task with dual PRF. This bug was appearing between sweeps with specific configurations of IRIS/RVP10 giving a false warning of 'Serious errors were detected in the previous CPI.
- WRSW-87: (N)LFM filter bandwidth entered in dspx not being saved to IFDR10 settings correctly. When the pulse type is changed to LFM or NLFM pulse in the dspx Mw<x> menu, the filter bandwidth will be hardcoded to 1,000,000 Hz in the generated IFDR10 settings, regardless of the value given in the "Bandwidth of transmit pulse" question. Or, if the pulse type was already (N)LFM, then the filter bandwidth is left to whatever was already configured in IFDR settings and not being changed when the user inserts a new value to dspx.
- WRSW-143: Move pulse width control from shared DSP library to RVP10. Gives RVP10 the explicit control of the pulse width selection and trigger rate to simplify preventing over duty cycle situations. Note: This also now allows changing the pulse width from within dspx.
- WRSW-152: RVP10 missing rays in dual prf task. There were too many missing or skipped radials in RVP10. This was caused when the antenna angle information received from the decoders was updating the antenna's modeled position within the FPGA, causing small jumps in the model. When these jumps crossed a Hi/Low-PRF boundary during dual PRF operations, the FPGA incorrectly assessed that the number of pulses required within the Low PRF radial could not be completed within the time remaining. This issue was fixed by applying a pre-filter to angle encoder information being inserted into the antenna model on the FPGA.
- WRSW-154: Inconsistent LOG Power in Pr plot. This is similar bug in RVP10 as stated in WRSW-39 above and fixed in similar manner. However, this bug appeared when looking at power levels between a CW and NLFM pulse of the same length.
- WRSW-172: DSP critical error during RVP900 startup. This was a bug only applicable to the RVP900 product after the IRIS/RDA 10.0 release. IRIS Radar was not able to automatically start radar scans signaling a 'DSP critical error' after power cycles or rebooting of the computer in RVP900 systems. This was due to changes made in starting the RDA software services in the RVP10 project. We have relaxed time needed to initiate networking devices which allowed the services to start correctly in the RVP9 instance.

- WRSW-174: Restore GPIB support to RCP8. Changing the build system from using make to cmake had broken the support of controlling devices using the GPIB interface.
- WRSW-200: Collect logs script missing files if not run as admin/sudo. IRIS/RDA provides a script to conveniently capture all logging information from the radar system into one file called '`collect_irisrda_logs`'. This script was broken with the IRIS/RDA 10.0 release when not executed by a user having sudo rights.
- WRSW-264: dspx plots get stuck when adjusting bandwidth. The dspx Ps plot sometimes hanged when a user was adjusting the bandwith values within the plot using the 'w' and 'n' keys.
- WRSW-265: After fresh start requested PW is 0.0 µs. When RCP8 and RVP10 are restarted the requested pulse width is 0.0 µs until explicitly requested to change pulse to one of the configured definitions. The intended functionality was that the startup state would be the default values for mw0.
- WRSW-317: When running FFT processing mode in ASCOPE or an IRIS Task, too large data arrays caused a corruption.

3.2 IRIS release notes

3.2.1 IRIS updates and new features

- Support added for the conversion of Level II moment/data type and Level III product to/from ODIM HDF5 v2.4 and IRIS Raw and protobuf format.
- The RAIN1 product now accepts PPI's as input. Previously RAIN1 only accepted SRI or CAPPI as input.

3.2.2 IRIS bug fixes

- WRSW-66: Callback list warning when opening Radar status menu. When the Radar Status Menu is opened from the IRIS Menu, there is a warning printed in terminal window.
- WRSW-89: Latest ASCII and CSV pipes can work with command line only, it can't work via IRIS Output process. The latest ASCII and CSV conversion pipes were functional only from command line. Changes were made so that IRIS Output Process can make use of these pipes so that conversion can be automated.
- WRSW-137: Fix bugs related to data_converters pipes received from customers. Fixed conversion of radar site metadata from IRIS Raw to protobuf format used by IRIS Focus which was causing some data to appear incorrectly in IRIS Focus.
- WRSW-141: Fix zero radial width some pipes are writing to IRIS RAW preventing IRIS Focus from data display. Very old pipes converting from UF and Rainbow formats to IRIS RAW inserted a radial width of zero as these other formats hadn't provided the start/end information of each radial. This was causing a problem when converting the IRIS RAW format to protobuff as IRIS Focus has a check to not allow radials having zero width.
- WRSW-155: IRIS client menus size issues. Fixed many small issues related to the spacing and sizing of fields and drop-down boxes within IRIS Client menus.

- WRSW-173: Add BMPSatToIRIS pipe back to data_converters. It had been decided to repricate this data convertor from the IRIS/RDA 10.0 release which converted satellite images in .bmp format to a User Product, which could be displayed in the IRIS Quick Look Window. However, due to a customer request, the data pipe was added.
- WRSW-241: IRIS product output menu crash. A very old bug was discovered by a customer: if the IRIS Output Menu produced a list of products greater than 286 lines, the menu crashed. In Vaisala's internal testing, this bug also appeared with the Ingest and Archive Menus. It is now fixed in all menus.
- WRSW-242: IRIS archive menu not working. A bug triggered an ‘exit handler’ error when mounting archive location in certain configurations.
- WRSW-301: Fix incorrect spname value assignment in hdf52iris. Fixed an issue with character length of the ‘sitename’ fields when converting from ODIM HDF5 format to IRIS Raw.

4. IRIS and RDA 10.1.0 Release notes

10.1.0 Release notes cover the changes made in IRIS and RDA since release 10.0.1 (January 2024).

If you have an earlier release than 10.0.1 and you are now installing 10.1.0, please also read the release notes for earlier releases to see all the information about changes between releases.

10.1.0 is built for AlmaLinux 9 . Information for upgrading AlmaLinux from version 8 to version 9 is included in the documentation. See *IRIS and RDA Software Installation Guide (M212924EN)*, which includes instructions for upgrading AlmaLimux 8 to AlmaLinux 9, installing AlmaLinux 9 on a fresh system, and installing the application software.

IMPORTANT INFORMATION BEFORE UPGRADE: The IRIS/RDA 10.1 release adds new features which affect trigger timings. Compensation accounting for internal link latencies within the IFDR10 have been added when synchronizing the ADC, DAC, and trigger timings to the master clock. This will cause timing changes to the triggers provided to the transmitter. If you are unsure about how to properly adjust trigger timings so that the burst pulse is centered at range zero, contact the Vaisala helpdesk for assistance before upgrading.

4.1 RDA release notes

This is a major release for the RDA software adding support for weather radar systems using solid-state power amplifiers, klystrons, and other coherent transmitters. RVP10 can now generate IF waveforms to be given to coherent transmitters for up-conversion to RF and amplification. These features include various forms of pulse compression, linking a series of pulses together into a common transmit sequences, defining time and phase modulations between pulses, all within a single pulse repetition interval.

Updates are highlighted in RDA updates and new features (page 13) of this document. For more information, see *RVP10 User Guide (M212604EN)*.

4.1.1 RDA updates and new features

- Support for coherent transmitter technologies, such as SSPA, klystron, and traveling-wave tubes generating pulses up to 200 µs in length.
- SZ2 and pseudo-random phase control support.
- Support for radar systems with multiple transmitters.
- Support for multiple trigger timings.

- Introduced the global duty cycle value, which is used to validate all pulses and/or transmit sequences that do not exceed the maximum stated duty cycle of a transmitter. In the past releases, this function was performed but needed to be defined by stating a minimum trigger period for each pulse length. As some configuration concepts have changed, this setting was simplified.
- Many changes were made within the **dspx mw**, **mt**, **mc**, and **mz** menus. The **pulse ambiguity plot (pa)** functionality was also updated. There is also now additional zooming and control of axis span in **ps** plot.
- IFDR10 now supports sampling MUX'd receiver IF and burst pulse samples on the same co-axial line into the ADC port.
- The IFDR10 general purpose I/O connector properties may now be defined and assigned logical meaning with the Softplane definitions.
- RDA software is now compatible with SELinux and firewall, which is now enabled by default during installation.
- IFDR10 now includes a Management Function service, which contains versioning information, updating sub-service, hardware status, and network/ntp configuration, which also watches and maintains other services running on the device. In the previous release, only one rdaservice was utilized. This caused a problem when attempting to upgrade firmware on the IFDR10.
- It is now possible to bound software licensing to IFDR10 hardware.
- All Dynamic Kernal Management (dkms) packages have been converted to AKMOD.
- Created ability to interrupt the **zauto** process to manually stop **autocal** before completion.

4.1.2 RDA bug fixes

- SIG-2432: The RVP10 would crash if a user attempted to define more than four pulse/filter definitions in the mw menu of dspx.
- SIG-2542: When operating in dual-PRF mode, there were instances where IFDR10 was not changing the trigger rate correctly when crossing the PRF boundary, caused when too many samples were being requested within a sector given the rotational rate of the antenna.
- SIG-2655: When '`output triggers while idle`' was set to '`true`', it conflicted and ignored the '`blank output triggers during a noise measurement`' setting.
- SIG-2658: The **radarop** user account did not have the ability to run **`journalctl`** to view logs.
- SIG-2670: The internal noise dithering signal was inadvertently being seen within the various plots of the **dspx** utility. We now turn noise dithering off while displaying **dspx** plots.
- SIG-2725: The setting '`burst sample to feedhorn distance`' configured to a value less than 0.6 meters would cause the `IFDR10 rda_service` to restart each measurement sequence.
- SIG-2734: The **Ascope** utility does not update the maximum range field when switching between pulse definitions. This may sometimes cause an issue when switching to a pulse have small range bins, such as 15 m.
- SIG-2756: In the **manuals** utility, changed the icons to open the RVP manual to state 'RVP10' or 'RVP900' according to which hardware is present.

- SIG-2762: The **dspexport** service is not used within the RVP10 and is now disabled by default.
- SIG-2767: Starting with RDA version 9.1, the **zauto** utility was broken when using a noise source for automatic calibration.
- SIG-2794: Added higher resolution to when listing **zauto** data points to a file changing from tenths to hundredths of a decibel.
- SIG-2800: If having a signal generator that requires an LXI interface, the environment variable to locate the LXI logfile was pointing to the wrong path.
- SIG-2801: When using the **zauto autocal** function with a single point power calibration the siggen power level was not being set correctly.
- SIG-2804: For radars with alternating dual-polarization capability, the full set of dual-polarization moments were not being computed.
- SIG-2843: When the RCP8 was configured to use Ethernet interfaces but the target device was offline, the RCP8 was trying to re-establish a connection but not releasing old handles leading to eventually running out of file handles resulting in the '`Too many files open`' error.
- SIG-2856: With IRIS RDA 10.0, **RDAFLASH** was only functional with RVP10 hardware. This was fixed and distributed in a IRIS RDA 10.0.1 patch so that older hardware's firmware could also be maintained.
- SIG-2859: On a system with RVP900 software configuration, the `rdaflash` script should not check for IFDR10 hardware.
- SIG-2906: The attenuation data types (Ah/Az/Azdr) initially re-used the scale/resolution of the SNR data type. The scaling was too coarse for functional use of these type of data. We have redefined the scaling of these data.
- SIG-2911: Changed the '**`idle trigger rate`**', or the trigger being sent to external transmitter when data is not be collected, to its own unique value instead of pointing to a default value within a MT pulse definition. This avoids possible over-duty cycle situations when change pulses during idle state.
- SIG-2912: Triggers requested when 'idle' were not being sent to transmitter after power cycles or reboots of IFDR10. Idle triggers would appear after first measurement was complete.
- SIG-2930: Some radar systems did not have a way to power-cycle the IFDR10 remotely. Added ability to force IFDR10 power cycle from the RVP10 server software via the gRPC interface.
- SIG-2991: The `sigmet_env` command line tool was not compatible with the file system hierarchy introduced with IRIS RDA 10.0 version. A -setown option has been also added to change file ownerships as needed.
- SIG-2923: The `DC Gain` value within the **ps** plot of the **dspx** utility was being calculated incorrectly in IRIS/RDA version 10.0.
- SIG-2975: In IRIS RDA 10.0, when HydroClass was being computed within the RDA were not getting correct melting level height information. This was fixed in the IRIS RDA 10.0.1 patch.
- SIG-3034: When flashing IFDR10, we now save the settings stored on IFDR10 before flashing, in case we lose the setting during the firmware update.
- SIG-3087: The AlmaLinux9 10.0.1 path ISO image did not allow a user to select IRIS RDA RPMS for installation.

- SIG-3176: In the IRIS RDA 10.0 release, there was inconsistency of the calibration values seen in the **zcal** results file, the *ZAUTO1.DAT* file, and values within metadata of the data files. The inconsistency existed when using ZAUTO with '**Polarization transmit scheme**' set to single in conjunction with the **autocal** function.
- SIG-3178: When logged in as **admin**, trying to save any IRIS RDA configuration files would fail due to lack of permissions.
- SIG-3181: The IRIS RDA **radarop** level of users should only have **sudo** access to functionalities needed to manage the radar and associated software. These are:
  - start/stop IRIS
  - start/stop RCP8
  - start/stop RVP900 or RVP10
  - run sigmet_env
  - start/stop sigbru
  - run init_sigbru_dvd
  - run sigbrush
- SIG-3195: The 'restore' configuration option within **dspx** would write the restored values to IFDR10 before the using was asked to verify the values to be restored with a **Y/N** question.
- SIG-3215: IFDR10 can enforce trigger blanking when the IFDR10 system time is adjusted by NTP when having a low quality NTP time source. This was due to antenna timestamps being received not matching close enough to FPGA time.

4.2 IRIS release notes

The IRIS RDA 10.1 major release is targeted to implement new RVP10 features. There are very few changes to IRIS. However, the changes made within the operating system environment for RDA also apply to the IRIS installations. For information on these changes, see RDA release notes (page 13).

4.2.1 IRIS updates and new features

- IRIS software is now compatible with SELinux and Firewall, which is now enabled by default during installation.
- A few changes in the IRIS **Setup** utility to make text consistent with new concepts introduced with release of the RVP10.
- Added '**timeshifter**' to Data Convertors RPM. **Timeshifter** allows replaying archived data into the IRIS software as if the data was being collected in real-time. This is useful for product demonstrations and testing.
- Added new data conversion pipes to Data Convertors RPM supporting conversion:
  - to/from NetCDF CfRadial 2.0 to our Protobuf format
  - Level3 product data to/from ODIM HDF5 format and Protobuf format
  - New human readable structures to view RAW and Product data (iris2csv, iris2ascii, and iris2xml).

4.2.2 IRIS bug fixes

- SIG-2742: Starting with IRIS RDA 10.0, the **setup** utility was only being initialized as a radar system having configurations for the RVP and RCP devices. This is wrong when the system is designed to be an IRIS Analysis.
- SIG-2788: The TCPIP notification scheme for notifying a process that files were transferred was broken in IRIS RDA 10.0.
- SIG-2870: A sub-task (ex: VOL_B) of a hybrid task would not start execution on a passive IRIS radar server under the control of a master server.
- RDANH-43: Added support to convert NetCDF CfRadial files containing multiple sweeps and retrieve radar name from the NetCDF file instead of using a site_map lookup table.
- RDANH-137: Fixed an issue in the handling of hybrid scans within the raw2pb data convertor which resulted in improper handling of non-hybrid scans. This change also impacts the raw2odimhdf5 pipe which is dependent of raw2pb.

5. IRIS and RDA 10.0.1 release notes

5.1 RDA release notes

This is a major release for the RDA software adding support for weather radar systems using solid-state power amplifiers, klystrons, and other coherent transmitters. RVP10 can now generate IF waveforms to be given to coherent transmitters for up-conversion to RF and amplification. These features include various forms of pulse compression, linking a series of pulses together into a common transmit sequences, defining time and phase modulations between pulses, all within a single pulse repetition interval.

Updates are highlighted in RDA updates and new features (page 13) of this document. For more information, see *RVP10 User Guide (M212604EN)*.

5.1.1 RDA updates and new features

- Add support for the use of a new magnetron transmitter sub-system within Vaisala Weather Radar WRM200.
- Add support within **rdaflash** utility to upgrade firmware found in SSPA radar components.

5.1.2 RDA bug fixes

- 2906: The specific attenuation data types (Ah/Az) were implemented re-using the same data model as signal-to-noise ratio (SNR). This scaling did not provide sufficient storage resolution in order to use specific attenuation as input to further processing steps downstream. Ah/Az was re-factored to use its own inclusive scaling and resolution.
- 2856: The `rdaflash` utility to upgrade RVP9 IFDR firmware would fail in the 10.0.0 release.
- 2843: When the RCP8 process was set to use an Ethernet interface to a signal generator but the signal generator was not available, the RCP8 would try establishing connection multiple times. The system would eventually open too many file handles in these attempts and crash the RCP8 process.

5.2 IRIS Release Notes

No changes have been made to IRIS Radar/Analysis in this release.

6. IRIS and RDA 10.0.0 Release notes

10.0.0 Release notes cover the changes made in IRIS and RDA since release 9.1.0 (April 2021).

If you have an earlier release than 9.1.0 and you are now installing 10.0.0, please also read the 9.1.0 release notes to see all the information about changes between releases.

In these release notes, “RVP” refers to a feature that is in RVP10.

10.0.0 is built for AlmaLinux 8.x and 9.x versions. Earlier versions up to 9.1.0 were built for CentOS 7.
Installation of the IRIS/RDA 10.0.0 always requires a complete installation; there is no upgrade path from earlier releases.
The IRIS/RDA installation process has been completely refactored to use the Red Hat Package Management (rpm) system. The legacy Sigmet installation tools are no longer supported in this release. Please read carefully *IRIS and RDA Software Installation Guide (M212924EN)* for instructions before installing release 10.0.0.

The File System Hierarchy for IRIS and RDA has been completely redefined to conform to modern Linux practices. The path `/usr/sigmet` no longer exists.

6.1 RDA release notes

This is a major release for the RDA software adding support for weather radar systems using solid-state power amplifiers, klystrons, and other coherent transmitters. RVP10 can now generate IF waveforms to be given to coherent transmitters for up-conversion to RF and amplification. These features include various forms of pulse compression, linking a series of pulses together into a common transmit sequences, defining time and phase modulations between pulses, all within a single pulse repetition interval.

Updates are highlighted in RDA updates and new features (page 13) of this document. For more information, see *RVP10 User Guide (M212604EN)*.

6.1.1 New RDA features

Support for RVP10 Digital Receiver and Signal Processor

- For more information about RVP10, see *RVP10 User Guide (M212604EN)*.

Dual-PRF range extension

- Maximum range of data when operating with dual-PRF range unfolding has been increased. In the previous versions, the range was limited by the maximum unambiguous range (Rmax) of the high-PRF sectors. This led to discarding valid data from the low-PRF sectors. Now the valid data from the low-PRF sectors is retained, and an interpolation is performed across the sector using the 2D 3x3 speckle filter.
- The Task Configuration Menu (TCM) functionality has been refined to notify users when they are requesting data beyond the maximum unambiguous range of the high-PRF. When user requests a maximum range greater than Rmax of the high-PRF, but less than the Rmax of the low-PRF, the range field turns yellow. This indicates the 2D 3x3 speckle filter will be used to interpolate across the radial boundaries. If a user inserts a maximum range greater than Rmax of the low-PRF, the field turns red indicating this is not a valid scan design.

6.1.2 RDA bug fixes

- 1870: Suncal not working in release 9.1.0
- 1880: In the Setup utility, the question "Test signal gen control in use" is hidden unless "Polarization Diversity" is enabled.
- 1921: The Antenna utility is unable to set Siggen Frequency if RCP Pulse Width Control or Pulse Width Status is not enabled. The functions should be independent.
- 2416: With supporting ever higher ADC sampling rates, the x-axis scale of the Ps plot no longer contained enough resolution to properly display the burst pulse spectrum, as the x-axis was originally dependent of the sampling rate. We have now added ability to zoom into portions of the x-axis to display the burst pulse spectrum at higher resolutions.
- 2666: The `TsArchExec` service was still running after the tsarchive GUI was exited by the user. This caused conflict when attempting to start `tsarchive` the following time.
- 2688: Enable time series playback into RVP9/10 server when not having an IFDR device connected. This allows processing of recorded IQ data with no IFDR.
- 2690: ASCOPE gets dsp_read error after running `tsarchive` in local playback mode then switching to local RVP.

6.2 IRIS release notes

The IRIS RDA 10.1 major release is targeted to implement new RVP10 features. There are very few changes to IRIS. However, the changes made within the operating system environment for RDA also apply to the IRIS installations. For information on these changes, see RDA release notes (page 13).

6.2.1 New IRIS features

- IRIS now uses a new file system based on Filesystem Hierarchy Standard (FHS). For more information, see *IRIS and RDA Software Installation Guide (M212924EN)*.

- The interface to Network Manager (NM10) has been expanded. NM10 now receives all data fields available in the IRIS radar status menu. This change expands the ability of NM10 to remotely monitor radar systems. The fields passed to NM10 include:
  - All Bitex faults
  - Transmit status
  - Servo power status
  - Magnetron status
  - Waveguide pressurization status
  - Interlock status
  - Airflow status
- New IRIS input and output pipes. For more information, see tables *IRIS input pipes* and *IRIS output pipes* in *IRIS and RDA Utilities Guide (M212925EN)*

6.2.2 IRIS updates

- When reading Leosphere lidar data for conversion to IRIS format, improved the data convertor to read the lat/lon values provided from the on-site GPS source.
- Expanded the file naming options when using the `IrisToGoogle` pipe enabling radar site ID to be included in the filename.
- Extended the `IrisToOdimHdf5` and `IrisToBufr` conversion pipes to support the following:
  - Additional products (SRI, BASE, HMAX)
  - HydroClass data type within all cartesian products during conversion

6.2.3 IRIS bug fixes

- 1881: In the IRIS Setup utility, restored the correct default options for the gaseous attenuation values for S, C, X, Ka, and W-band radar systems.
- 1889: Fixed an issue introduced in release 9.1.0 where the `IrisToNetcdf` pipe would only output the UCAR schema, even though a different schema was requested.
- 1890: Fixed problem in IRIS GUI not showing all available operating modes for conducting mode switching.
- 1917: Fixed issue in `IrisToUf` pipe where sometimes occurred time conversion from Local to UTC.
- 1922: When converting an IRIS RAW file from PPI scans using the `IrisToOdimHdf5` pipe, it was found that the reverse conversion from `hdf52iris` would result as data believed to be RHI scans.

7. IRIS and RDA 9.1.0 Release notes

These notes cover changes made in IRIS and RDA since release 9.0.0 (December 2017). If you are upgrading from an earlier release, please read those release notes also. In these release notes, “RVP” refers to a feature that is in RVP900.

Binaries available for CentOS 8.0. Note that the official release is built for CentOS 7.6. Vaisala reserves the right to stop the support for CentOS 8 at any time.

7.1 RDA release notes

This is a major release for the RDA software adding support for weather radar systems using solid-state power amplifiers, klystrons, and other coherent transmitters. RVP10 can now generate IF waveforms to be given to coherent transmitters for up-conversion to RF and amplification. These features include various forms of pulse compression, linking a series of pulses together into a common transmit sequences, defining time and phase modulations between pulses, all within a single pulse repetition interval.

Updates are highlighted in RDA updates and new features (page 13) of this document. For more information, see *RVP10 User Guide (M212604EN)*.

7.1.1 New RDA features

New calibration features

- New setup field added for digital filter loss computation for each pulse width. This is taken into account in the radar constant when performing the Zauto calibration. Filter loss value to be entered can be checked from the **Ps** and **Pa** plots of the **dspx** utility (RxLoss). Ps plot value uses actual burst signal, and Pa the waveform data (applicable only if waveforms generated by RVP900 are used).
- Update other pulse width functionality added to **Zauto** utility. It uses the noise equivalent bandwidth (NEBW) of each pulse width to update the calibration of the other pulses from the calibration of a single pulse width. A new setup field has been added for the NEBW for each pulse width. The NEBW value to be entered can be checked from the **Ps** plot of the **dspx** utility.

Dual-transmitter calibration support

- New setup field added to have separate **Transmit power at calibration** values for H and V channels for each pulse width.

- Automatic continuous burst power -based calibration correction of Z and ZDR added to compensate for the transmit power variations. This feature is enabled in the **Mp** section of the **dspx** utility. Related to this, a new setup field **Burst power at calibration** has been added for H and V channel for each pulse width. The correct values to be entered can be checked from the **mtN** section of the **dspx** utility (**Current burst pulse levels**) after the radar has measured an adequate amount of pulses with an Ascope or IRIS task.

Hybrid pulse blending dual-polarization parameters

- The blending algorithm for combining short and long pulses returns when using pulse compression has been extended to the dual-polarization parameters, eliminating the gap caused by the hybrid pulse.

7.1.2 RDA updates

- Frequency control added to the signal generator interface with related new setup fields.
- New setup field added for signal generator with a fixed output power level.
- Added the possibility to use the same channel for Rx and burst pulse sampling. This feature is enabled via the **Mb** section of the **dspx** utility.
- The transmitted waveform ambiguity plot (Pa plot in dspx) now has the capability of showing a symmetrical plot, has a zoomable time, and can be shifted in both direction (left and right).
- In the receiver waveform plot (Pr plot in dspx), the zoom over time for long pulses is now available.
- RVP9 log now reports the averaged `phidp_r0` value at the exit from the major mode only if the minimum required number of rays have been used to compute `phidp_r0`.
- Pulse compression maximum pulse increased to 105 µs (15000 taps).
- The following parameters have been added to the Ps plot: Burst pulse energy, Filtered burst pulse energy, Noise equivalent bandwidth.
- Filter loss calculation reported in the Pa and Ps plots is now calculated accounting for the filter loss correction or bias. The legacy calculation is kept under the filter match in the Ps for reference.
- Added Peak Ethernet-CAN-GW interface for WRS400 radars.
- Added Moxa Modbus/TCP I/O.
- Added CANopen interface to motors and encoders.
- Added an interface to WRS400 transceiver.

7.1.3 RDA bug fixes

- 1643: Increase the length of `antlib` log string, and add a line change in the case that string is still too long.
- 1662: Noise sampling gives a wrong result if using max number of filter taps
- 1388: dspx/pa tool ISL and PSL showing 0dB for NLFM pulses
- 1184: Point Clutter filter of the RVP9 is broken if hybrid pulse is enabled
- 1525: PHIDP step between short and long pulse data points
- 1641: Pr plot disappears for CW pulses with filters shorter than 3.55 µs
- 1535: Pr plot spectum incorrect for large time Span values

- 23672: Fix to the power monitor sample filtering. Power monitoring was giving false alarms in some cases where the reflective power was fluctuating around the measurement low limit.

7.2 IRIS release notes

The IRIS RDA 10.1 major release is targeted to implement new RVP10 features. There are very few changes to IRIS. However, the changes made within the operating system environment for RDA also apply to the IRIS installations. For information on these changes, see RDA release notes (page 13).

7.2.1 IRIS updates

- HydroClass now uses the *hydroclass.conf* configuration file.
- Added support for reading netCDF CF/Radials generated by UCAR Radax.
- Increased the maximum number of sites for selection in the real-time display.
- The BUFR pipe has been updated as follows:
  a. The creation of the following products is now supported: Z Raster, Dual Pol concatenations and Arome
  b. Naming convention now allows the following format:
  T_TTAAii_C_CCCC_yyyyMMddhhmmss.bin
  Where:
  yyyy = year, **MM** = month, **dd** = day, **hh** = hour, **mm** = minutes, **ss** = seconds,
  CCCC = the emitting center (SOCA for Kourou)
  TTAAii = the type of product (which can be raster, dual pol concatenations or Arome).
- For running this new pipe, make sure the following rpms are installed in your system: *bufr-3.2-3.el7.x86_64.rpm* and *bufr-devel-3.2-3.el7.x86_64.rpm*

- odim_HDF5 pipe updates
  a. The following naming convention is now supported:
     `<id>.<YYYYmmddTHHMMSSZ>.<seq>.<prod>.h5`
     where:
     `<id>` is the numerical radar id
     `<YYYYmmddTHHMMSSZ>` is the UTC timestamp of the scheduled time of the volume.
     `<seq>` is a 3-digit sequence number
     `<prod>` is a product name field designed to allow multiple product outputs from a single radar schedule.
  b. Moment encoding is now forced to 16-bit.
  c. Gain, offset, nodata, undetected and quantity metadata has been moved to */datasetN/dataM/what* structure.
  d. We now support source encodes multiple identifiers as per the ODIM specification.
  e. Added a freeform string for adding metadata in a configuration file.
  f. SQI threshold information is now available as metadata.
  g. Clutter type index is added to the metadata in JSON format.
  h. **highprf** and **pulsewidth** are now stored in */dataset1/how*
  i. Added **/how/scan_count**, **/dataset1/how/NI**, **/dataset1/how/astart**, **/dataset1/how/lowprf**, **/dataset1/how/scan_index**.
  j. **highpfr** is now reported as double.
  k. Types of **/how/scan_count** and **/dataset1/how/scan_index** have been updated to be long (64 bit).
  l. **/dataset1/how/scan_index** now starts from 1 as per the Odim standard.
  m. **/dataset1/where/rstart** is now reported in km.
  n. The following parameters have been added:
     /how/beamwH
     /how/beamwV
     /how/rpm
     /how/wavelength
     /datasetN/how/numpulsereq
     /datasetN/how/zdrcal
     /datasetN/dataM/how/dp_att_corr

7.2.2 IRIS bug fixes

- 1779: Wrong radar and ground height info in lidar-based products
- 1740: Creating a site code of less than 3 characters causes issues
- 1636: Cartesian products are given wrong "prodpar" attribute by IrisToOdimHDF5 pipe
- 1387: IRIS menu freezes if trying to open BITEX from Radar Status window
- 1660: Wrong radar model and coordinates with only one decimal sent to NM10
- 1759: Product generator crash when generating MLGHT product
- 1772: IRIS fails to remove shared memory, causing IRIS failing to startup after adding a new output device
- 1661: Socket server for IRIS Focus should give information on the Time configuration of the local machine (UTC/LOCAL)

7.3 Upgrade notes

- This release is built for the CentOS 7 operating system.
- After the upgrade, link the *dpolapp.conf* file to *hydroclass.conf* file with the following commands:

```
cd /usr/sigmet/config
mv dpolapp_C-band.conf hydroclass.conf
```

- When you upgrade from a previous version of IRIS to version 9.1.0, you need to install the following RPMs on the CentOS 7.x system. The RPMs are available on the ISO image *CENTOS7/extras/RPMS* in the directory where the installation CD is mounted.
  - *bufr-3.2-4.el7.x86_64.rpm*
  - *eccodes-2.14.1-1.el7.x86_64.rpm*
  - *eccodes-data-2.14.1-1.el7.noarch.rpm*
  - *libmodbus-3.0.6-7.el7.x86_64.rpm*
  - *libtirpc-0.2.4-0.16.el7.x86_64.rpm*
  - *netcdf-cxx4-4.3.0-7.el7.x86_64.rpm*
  - *netcdf-cxx4-static-4.3.0-7.el7.x86_64.rpm*
  - *python2-pip-8.1.2-12.el7.noarch.rpm* (IRIS Radar for X-band)

  Follow these instructions to install RPMs using *yum* from local system:
  a. Mount the IRIS ISO image for 9.1.0. The exact command depends on the media on which you have the ISO image. Example:

```
mount -o loop /dev/cdrom /mnt
```

  b. Copy *iriscentos7.repo.conf* from the mount point (in this example, */mnt*) to */etc/yum.repos.d/iriscentos7.repo*
  c. Edit the file with **vi** editor or other suitable editor: Replace the "*BASEURL_KEYWORD*" in the line *baseurl=BASEURL_KEYWORD/CENTOS7/extras/RPMS/* with "*file:// <mount point>*" where <mount point> is the location where you mounted the ISO image (in this example, *baseurl=file:///mnt/CENTOS7/extras/RPMS*).
  d. Create backup *dir/* in *etc/yum.repos.d/*
  e. Move all Centos repos to the backup *dir/*, and leave *iriscentos7* there.
  f. Run `yum clean all`
  g. Run `yum repolist`. If you edited the *iriscentos7.repo* correctly, you can now see *iriscentos7* in the the list.
  h. Install the RPMs from the list using *yum*. For example:

```
yum install netcdf- cxx4-4.3.0-7.el7.x86_64.rpm
```

  i. After installing the rpms, restore the repo files back to *yum.repos.d*

- The CentOS 7 systemd starts **rpcbind** with **-w** option ("warm start") . When IRIS is upgraded, it may happen that the **rpcbind** remembers the previous instance of the IRIS server, and does not allow the new version of IRIS server to bind. The workaround is as follows:
  a. Stop the **rpcbind** service:

```
systemctl stop rpcbind
```

  b. In the file */usr/lib/systemd/system/rpcbind.service*, remove **-w** from the following line:

```
ExecStart=/sbin/rpcbind -w ${RPCBIND_ARGS}
```

  c. Start the **rpcbind** service:

```
systemctl start rpcbind.service
```

  d. If "**connect > local**" still does not work, reboot the system.