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RESTRICTED

Release Notes

IRIS and RDA
9.1.0

VAISALA

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1. About this document

1.1 Version information

This document provides release notes for IRIS 9.1.0 and IRIS/RDA 9.1.0.

Table 1 Document versions (English)

Document code	Date	Description
DOC236879-C	August 2021	Updated the Upgrade notes. IRIS and RDA 9.1.0
DOC236879-B	April 2021	Combined Release Notes for IRIS 9.1.0 and RDA 9.1.0
DOC236879-A	December 2017	IRIS 9.0.0

1.2 Related documents

Table 2 Vaisala Weather Radar documentation

Document code	Name
M212337EN	*Weather Radar WRS400 Operation and Maintenance Guide*
M212338EN	*Weather Radar WRS400 Installation and Configuration Guide*
M211806EN	*Weather Radar WRM100/200 Operation and Maintenance Guide*
M211805EN	*Weather Radar WRM100/200 Installation and Configuration Guide*
M211838EN	*Weather Radar WRK100/200 Operation and Maintenance Guide*
M211839EN	*Weather Radar WRK100/200 Installation and Configuration Guide*
M211849EN	*IRIS Focus User Guide*
M211850EN	*IRIS Focus Administrator Guide*
M211904EN	*IRIS Focus Release Notes*
M211315EN	*IRIS and RDA Software Installation Guide*
M211318EN	*IRIS Programming Guide*
M211316EN	*IRIS and RDA Utilities Guide*
M211319EN	*IRIS Product and Display Guide*
M211317EN	*IRIS Radar User Guide*
M211452EN	*IRIS and RDA Dual Polarization User Guide*
M211322EN	*RVP900 Digital Receiver and Signal Processor User Guide*
M211320EN	*Radar Control Processor RCP8 User Guide*

Vaisala encourages you to send your comments or corrections to helpdesk@vaisala.com.

2. 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.

2.1 RDA Release Notes

2.1.1 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.

2.1.2 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.

2.1.3 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.

2.2 IRIS Release Notes

2.2.1 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`

2.2.2 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)

2.3 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.

3. IRIS and RDA Release Notes 9.0.0

These notes cover changes made to IRIS and RDA since version 8.13.7 of June 2017. If you are upgrading from an earlier release, please read those notes as well.

This is a new major release, since support for RVP8 systems in code base has been removed completely. In addition support for 32-bit systems has been dropped.

This document uses the term “RVP” to refer to features in RVP900.

3.1 RDA Release Notes

3.1.1 New features

- Increased the maximum number of range bins to 8168. The maximum number of bins and data moments in this version is thus 16 (2 bytes) data moments x 8168 bins.
- Added support for dual burst pulse sampling. IFDR has a mode that allows the burst pulse to be received on the same channel as the Rx input. In this mode and in single channel mode it will Receive data and burst pulse on ADC-A / CH1. In dual pole mode it will receive data and burst pulse on ADC-A & B / CH1 & 2. The code that manages the I and Q processing in RDA handles dual burst samples so that it is processing each channel separately using the results in bin 0 for that channel.
  To configure the new mode a question was added in the Mb menu "Burst Pulse and AFC". The new question is "Use the same channel for Rx and Burst Pulse Sampling". It defaults to NO which uses the TXB (ADC-E) for the burst pulse. If set to Yes will enable the new mode. There is a new parameter in rvp9.conf called lBurstSelectRx to store this configuration setting.
  There are several functions including AFC/MFC, Burst Pulse tracking and hunting that are still limited to using a single TX channel even when two bursts are present. They will either sample the TXB (ADC-E) when lBurstSelectRx =0 or they will sample CH1 (ADC-A = horizontal) when lBurstSelectRx=1. Therefore these functions will still operate but will not track and monitor both burst inputs they will base their assessment on only a single burst input.
- Added support for long NLFM 100us compressed pulse.

3.1.2 Bug fixes

- 1466: If in previous releases a hybrid pulse was configured in such a way that the number of bins in the long pulse + the number of bins in the short pulse was greater than the maximum number of bins, the data structures would be overflowed causing loss or corruption of data in the moment calculations.
- 1470: BITEX fails to open if the antlib.log is zipped. Fixed by adding "nocompress" option to the /etc/logrotate.d/sigmet-antlib.
- 1473: Burst Power Based Correction of Z0 was fixed and made functional.

- 1518: Number of output bins was limited in certain situations. There was a loop counter in the ingest process that had only 16-bits. When the payload of a ray has more than 2^16 bytes of data this causes the counter to overflow and hang the process or cause a segmentation fault. Payload size = some bytes of header + Number of Bins * Number of Moments * Number of bytes / moment. So if you are running 8.13.7 or earlier then you will want to limit your number of bins and number of moments to keep the payload under 2^16. Bug fix in 9.0.0: Increased the loop counter to be 32-bits.
- 1530: Naming of two new data moments that are available since 8.13.7 was changed to avoid confusion. CSP was changed to CSR and CCOR to XCOR.
- 1566: Changed the default value in rvpts.conf for rvptsConfig.nIQDVecs = 25600000 to support using increased number of range bins.

3.2 IRIS Release Notes

3.2.1 New features

1. 1520: Leosphere LIDAR data input pipe was modified to include timestamp in the beginning of the scan.
2. 1257, 1500: Support for Vaisala NM10 Network Manager product added. Antenna Status Service ant2nm will update the Network Manager at a regular configurable interval with Antenna Status information.
3. 1403: HDF5 input pipe supports Opera HDF5 format version 2.2.

3.2.2 Bug fixes

1. Inconsistent output file names generated by IrisToOdimHdf5. Reported issues:
   - Month number is 0-based (0-11) when RAW files are converted.
   - Missing one digit in hh, mm, or ss parts of the name when count is less than 10.
   - The file name prefix is "ODIM Node" when it is RAW product and "ODIM Place" for all other products.
   - When radar site is configured to use local time, the time stamp in case of non-RAW products in in local time while for RAW products, it is in UTC.

   Under normal circumstances the output file names are controlled by IRIS. This pipe creates *.meta with the list of suggested names. When IRIS sees *.meta files, it reads it and renames files when files are copied to the final destination. Contents of *.meta file was modified to output consistent file names.
2. 1606: There was a bug that caused corrupted raw files when turning on the Vc or Zc in the task configuration and selecting 2-byte data moments.
3. 1530: Naming of two new data moments that are available since 8.13.7 was changed to avoid confusion. CSP was changed to CSR and CCOR to XCOR.
4. 1508, 1449: Fixed a bug in ZDRcal and Suncal utilities that caused segmentation violation when those utilities were printing error messages. IRIS-1486 and Bus Error when running Suncal and ZDRcal in exec task.
5. 1470: BITEX fails to open if the antlib.log is zipped. Fixed by adding "nocompress" option to the /etc/logrotate.d/sigmet-antlib.

3.3 Upgrade Notes

1. This release is built for the 64-bit CentOS7 operating systems. Support for the 32-bit CentOS6 operating system has been dropped.
2. Support for RVP8 systems in code base has been removed completely. If you are using RVP8 system, the last IRIS version that has RVP8 functionality is 8.13.7. RVP8 hardware component sales has ended many years ago and the official end of support was at the end of 2015. Now the SW support for RVP8 is dropped as well.