

RDA 8.13.4 RELEASE NOTES (23 SEPTEMBER 2014)

These notes cover changes made in IRIS since release 8.13.3 of 1 October 2013. If you are upgrading from an earlier release, please read those notes also. In these release notes, we use the word “RVP” to a feature which is in both the RVP900 and RVP8.

New Features

- Real-time attenuation correction of the High Sensitivity Reflectivity data type, dBZe, which is derived from the $|Rhv|$ correlation was implemented. The correction comes from the definition:

$$dBZe = [dBZh + dBZe]/2$$

which implies that the attenuation of dBZe is:

$$Ae = [Ah + Ah]/2$$

Ah is computed from iteratively constrained PhiDP as described in the Dual Polarization manual. IRIS-420

- The Non-Linear Frequency Modulation (NLFM) used for compressed pulses was improved. Since the first implementation the non-linear modulation was conducted by defining three linear segments having different slopes for the frequency modulation. The new implementation uses true curves allowing a more gradual ramp of frequency change in the time domain. This allows the removal of the blackman windowing function used during down conversion and restores ~3 dB. IRIS-907
- The RVP900 software process no longer requires the RVP901 IFDR hardware to be present. This allows time series playback for processing IQ data having just a computer with RVP900 software installed. It also allows a second signal processor computer within the radar system capable of receiving IQ in realtime across the network for parallel processing, perhaps with different configurations. IRIS-879
- Zauto was modified to support autocalibration using an internal signal generator for Vaisala's new AMR product. There are new command line options of `-amr` and `-pol H` or `V`. The `amr` flag should only be used on the Vaisala AMR product while the `-pol` flag can be used to set the transmit polarization during any use of autocalibration.

Bug Repairs

- A sporadic error message “HostCmds: Trigger waveform was alterered (Pattern)” was incorrectly being flagged by the RVP900 process’s and being issued. The source of the incorrect determination of this error has been found and fixed. IRIS-825
- During RVP900 computer booting the scripts to start the software process were executed in the needed pre-defined order. However, sometimes a process which had dependencies from others would take a longer time starting causing a segmentation violation crash. The startup script has been modified to ensure the process are started and completed in a serial manner which fixes the race condition. IRIS-899, IRIS-914
- It was found in 8.13.2 that when the PMI threshold was being applied to Z data, that if SQI was applied on V it inadvertently was also applied to RhoHV and PhiDP data. This has been fixed. IRIS-900
- When viewing ZDR data in ASCOPE the ZDR data quantities would be different when Range Normalization function was on vs. off. This problem does not appear when IRIS is controlling the RVP. ASCOPE was not using the RVP API interface correctly. IRIS-919

RDA 8.13.3 RELEASE NOTES (1 OCTOBER 2013)

These notes cover changes made in IRIS since release 8.31.2 of 18 March 2013. If you are upgrading from an earlier release, please read those notes also. In these release notes, we use the word “RVP” to a feature which is in both the RVP900 and RVP8.

Important Upgrade Notes

- It has been discovered with RDA 8.13.2 and RHEL5.x that the Synchro to Digital hardware interface and processing is not functioning at the speeds needed to resolve real movement of the antenna system. It is functioning correctly with RHEL6 releases. As we will soon be dropping support of RHEL5 all together, we are not fixing this bug due to its complication.
- In this release we are switching our default factory operating system to CentOS 6.x. CentOS is a free enterprise class computing platform which is 100% binary compatible with RHEL. This release will introduce a CentOS installation guide and kickstart. For those customers required to use RHEL, we will also continue to provide a separate kickstart CD for that environment.

New Features

- The GMAP clutter filter is now compatible with dual-polarization processing! As GMAP can be used in any major processing mode the default factory configurations for clutter filtering now become:

Filter #1	- Type:3(Gaussian Adaptive)	Win:1	Spectrum width: 0.100 m/sec
Filter #2	- Type:3(Gaussian Adaptive)	Win:1	Spectrum width: 0.200 m/sec
Filter #3	- Type:3(Gaussian Adaptive)	Win:1	Spectrum width: 0.300 m/sec
Filter #4	- Type:3(Gaussian Adaptive)	Win:1	Spectrum width: 0.400 m/sec
Filter #5	- Type:3(Gaussian Adaptive)	Win:1	Spectrum width: 0.500 m/sec
Filter #6	- Type:3(Gaussian Adaptive)	Win:1	Spectrum width: 0.600 m/sec
Filter #7	- Type:3(Gaussian Adaptive)	Win:1	Spectrum width: 0.700 m/sec

Each filter index now becomes sequentially more aggressive when stepping from index 0 to 7. If you are upgrading from previous versions it might be a good idea to modify the ‘mf’ section of dspix to a similar state, taking advantage of GMAP and improved useability.

It is highly recommended to use the GMAP ground clutter filter during the collection of any data, if ground clutter removal is desired. As a result of this work the Variable Least Square fit, “Var LSQ”, ground clutter filter has been removed.

- The thresholding of all the dual polarimetric moments now follows the settings for the ZDR data type. Previously all dual polarimetric moments, with the exception of ZDR, were thresholded in same manner as V. In practice the dual-pol moments do not require Doppler coherence and using a threshold such as SQI, sometimes needed on V, would inadvertently threshold dual pol moments in areas with good quality. Labeling of text fields in ASCOPE and the Task Configuration Menu now state Dual Polarimetric versus ZDR. IRIS-708, IRIS-753

- Additional to above, the secondary SQI value will be used if it is applied to any dual-polarimetric moment. This will allow setting a stronger SQI threshold for V and weaker values for dual-pol. IRIS-755
- The Redundant System Switch Over feature in the RCP02 has been ported to the RCP8. This is to support managing the active sub-systems for sites having duplicate transmitters/receiver racks through single antenna/pedestal. IRIS-628
- Improved the output from productx for the calibration metadata from the RAW product files. Users can now easily see and compare the noise floor values used in the H and V receivers at time of the data acquisition. IRIS-727

Bug Repairs

- The ‘Any Spectrum Size’ bit in the SOPRM Opcode was being stored correctly, causing incorrect results when reported back with GPARM. This is now fixed. IRIS-655
- The rvp9main process was hanging up in rare instances when data packets were dropped in the UDP time series stream from the RVP901 IFDR to the RVP902 computer. In the normal field install with direct link between IFDR and the computer this was not a problem. However when adding routers/switches/media convertors in-between the IFDR and RVP902 this became an intermittent problem every few days. Modified the IFDR and rvp9main process to handle dropped/reordered packets eliminating this lock-up event. IRIS-723
- In release 8.13.1 we introduced a new feature in the RVP to correct the Z calibration constant (AKA “Z0”) for changes in noise level between calibration time and the current time. However this led to conflicting calibration information stored in the raw product header.
- When using sector blanking, the last ray of data at the start of sector blanking was sometimes repeated for the first ray at the end of the sector. This was related to the direction of antenna movement and how angle syncing is performed in the boundary conditions. IRIS-791, IRIS-795
- Total Reflectivity (T) should be preserved but in the past some functions were modifying T, such as micro clutter suppression during range averaging and the point clutter filter. IRIS-715
- The introduction of the dual pulse hybrid pulse compression concept in RDA version 8.13.1 did not properly pass the noise floor levels from each pulse into the RPHASE processing mode. This has been fixed. IRIS-799
- Starting with version 8.13.2 ASCOPE would become extremely slow or freeze if both bin and range style plots were configured to be shown at the same time. Fixed. IRIS-802

- When implementing the hybrid pulse compression scheme in version 8.13.1 the vertical and enhanced reflectivity data were not obtaining calibration values from the two different pulses. Now all reflectivity data types are using the same dBZ0. IRIS-733
- During development of GMAP for dual polarization data processing, it was discovered that at times the last step of adapting the windowing function was not being performed per user's request resulting lower amounts of clutter mitigation when Clutter to Signal Ratio (CSR) was high or too aggressive filtering when CSR is low. IRIS-761
- The thresholding of data and execution of the 1D speckle filter were not acting as intended on single-polarization data in the PPP processing mode. These errors have been building up since the implementations of Dual Polarimetric Attenuation Correction and computation of the new Adaptive KDP in PPP processing mode. Several fixes were implemented to restore thresholding and speckle filtering to function as described in the product manual on single polarization data. IRIS-819, IRIS-823

RDA 8.13.2 RELEASE NOTES (18 MARCH 2013)

These notes cover changes made in RDA since release 8.13.1 of 30 August 2012. If you are upgrading from an earlier release, please read those notes also. In these release notes, we use the word “RVP” to refer to a feature which is in both the RVP900 and RVP8. Revised to svn 29191.

NOTICE

*** It has been discovered that with RDA 8.13.2 and RHEL5.x the Synchro to Digital hardware interface and processing is not functional. Please do not use this combination if your radar system uses Synchro angles. ***

New Features

- The online **manuals** supplied with IRIS and RDA are now shipped as single PDF files, and are built using modern tools, so more features, like a side-panel Table of Contents are available. IRIS–700

Bug Repairs

- In the **RVP**, the ZDR Offset did not take effect if the **dual-pol attenuation correction** was enabled. IRIS–468
- The **RVP** was outputting a power level too high before processing data. This would effect the zauto program if the **RVP** was reset before it was run. The bug was introduced in svn [28166] so it was in release 8.13.1. There is a patch on the ftp site for 8.13.1 The power was 8 dB too high on the **RVP900**, 6 dB too high on the **RVP8**, and 4.5 dB too high on the **RVP7**. IRIS–660, IRIS–646
- Fixed a bug in the **RVP** calculation of KDP. It was getting occasional rays containing all bad data. IRIS–704
- The **HClass** data frequently has bad ray segments with data type set to NoMet. These segments usually are half the range interval. This happens more frequently on the **RVP8**, less often on the **RVP900**. IRIS–577
- When installing the **RCP8**, the sigconfig script did not install the **kvasercan-lib** RPM on RHEL5. It worked correctly on RHEL6. IRIS–608
- In the **RVP** the 1D Speckle filter controls were not working independently for dual-pol data. Instead, the Doppler control bit turned it on for all data types. This is now changed so that the Log control bit controls T, SNR, Z, Ta, Za, Te, Ze, ZDR, LdrH, and LdrV, while the Doppler bit controls Width, Velocity, KDP, RhoHV, RhoH, and RhoV. HydroClass and SQI do not have the 1D speckle filter applied ever. IRIS–629

- In the **RVP** the 2D speckle filter (also known as the 3x3 speckle filter) was not working in PPP mode. IRIS–630
- In release 8.13.1 we introduced a new feature in the **RVP** to correct the Z calibration constant (AKA “Z0”) for changes in noise level between calibration time and the current time. This caused problems for upgraded systems which may not have a stored calibration-time noise level. So, we have enhanced the **RVP** code to make this adjustment optional, and defaulted the option to “No”. It also now detects if the `zcalib.conf` file contains the calibration-time noise, and forces this off if not. **Zcal** is also enhanced to allow easy entry of the calibration-time noise. IRIS–645
- There is a **setup** question to specify the maximum power level for the signal generator controlled by the **RCP8**. Unfortunately this value had to be entered twice. Once in the **RCP8** non-volatile setups accessible via **antx**, and once in the **setup** utility RCP section. This caused problems if they were set differently. We removed the **RCP8** non-volatile setup question, so this miss-configuration is no longer possible. IRIS–657
- The **RVP900** had a bug in the wide dynamic range mode. After a reset, it was taking many seconds to update the calibration coefficients in the IFDR. As a consequence, it could run for a while with the incorrect gain. This was particularly visible in **zauto**, where a jump in gain would happen about 10 points into the calibration. IRIS–679
- We no longer require config files AGC1.DAT, COGAIN1.DAT, and COSTCTAB1.DAT. These files were used by the **RVP6** to calibration AGC and STC, but we were still reading these files at startup. IRIS–690
- The feature of locking the licenses to the **RVP900** IFDR hardware instead of to the computer hardware was broken since release 8.13.1 when we removed the `/usr/sigmet/bin/rda` directory. IRIS–717
- In the **RVP**, the Point Clutter filter was not working in the PPP major mode. In all major modes, the filter now considers the point targets left after Doppler filtering i.e. dBZ (and dBZv, dBZe in dual-pol), while it was previously considering the unfiltered echo. In addition, the filter has been changed to not apply to unfiltered echo (dBt, dBTv and dBTe). IRIS–631
- Also the maximum look-aside bin distance in the point clutter has been raised from 3 to 5 bins in **ascope** and the IRIS Task Configuration Menu. IRIS–632
- In the **RVP**, the filter of Micro Clutter Suppression was not functional in PPP mode. The functionality is now restored in all major modes, and it can be activated in **dspx**, in order to improve range averaged data in clutter. IRIS–672
- The **tsarchive** daemons are now started and stopped using a service command. This is similar to how **IRIS** and the **RVP900** are started. Generally, this is invisible to the user. It solves a problem in which the owner of the time series buffer was different depending on which application started first. IRIS–584

RDA 8.13.1 RELEASE NOTES (30 AUGUST 2012)

These notes cover changes made in RDA since release 8.13.0 of 24 February 2012. If you are upgrading from an earlier release, please read those notes also. Revised to svn [28449].

Important Upgrade Notes

- There were changes in the recommended template dualpol.conf file. Please after upgrading to 8.13.1 copy that file with the following command:

```
$ cp /usr/sigmet/config_template/dualpol.conf $IRIS_CONFIG
```

New Features

- The **RVP900** now supports a new Wide Dynamic Range mode. This is implemented using two IF sampling at different gains, and will work in dual-polarization mode. Upgrade will require new IFDR firmware with rdaflash. IRIS-503
- The **RVP900** now supports a hybrid pulse transmission and processing. In hybrid-pulse mode, the **RVP900** transmits a long (say 50 microseconds), typically compressed pulse followed by a sort (say 1 microsecond) conventional pulse. The short pulse data is used to fill in near range weather, while the long pulse is used at larger ranges. This is important for low-power large-duty-cycle transmitters, such as TWTs. This included a whole range of changes and features listed here. Please contact the Vaisala weather radar service team to get your hybrid pulse radar configured and calibrated. IRIS-403, IRIS-514, IRIS-516, IRIS-517, IRIS-519, IRIS-520, IRIS-521, IRIS-522, IRIS-525, IRIS-526, IRIS-527, IRIS-531, IRIS-541
- Adding double sets of pulse-dependent meta-data to the time series recording. This includes: Number of (I,Q) samples, burst sample magnitude and phase, pulse width, band width, dBZ calibration, noise power, noise power at calibration, and burst power at calibration. Of these, the band width, noise power at calibration, and burst power at calibration were previously missing. The structure version numbers were incremented.
- Raised the maximum pulse width supported to 100 microseconds, up from 50.
- The RVP900 will record time series data from the second shorter pulse for twice as long at the dead zone created by the primary pulse. We then merge data over the overlap region to make a smooth transition.
- We have added support for the new **WSR98D connector panel**. This panel connects using two cables to J3 and J6 on the **RVP900** IFDR box. The various output and input signals are accessible to both the **RVP900** and **RCP8** programs. The **RCP8** interface signals are controlled via the **softplane.conf** file. If you wish to use this, you need to do the following:

```
$ softplane -resave
```

Then edit the `softplane.conf` file and set `splConfig.Rvp9[0].InUse = 1`. If changed, then run again:

```
$ softplane -resave
```

Then edit the `softplane.conf` file and set `splConfig.Rvp9[0].sNetPanel = "WSR98D"`. Again run:

```
$ softplane -resave
```

At this point your file will be populated with all the signals on the WSR98D panel, and their default **RCP8** signal assignments. IRIS-329, IRIS-558, IRIS-559, IRIS-560

Bug Repairs

- The **RVP900** and **RVP8** were signaling "UNIX Signal: Unexpected RVP9/Proc termination" when starting the antenna daemon. This causes the fault bit to stick indicating that there was a fault on power up. This was introduced in our new way of starting the antenna daemons in 8.13.0. IRIS-530, IRIS-531
- Fixed intermittent **RCP8** segmentation faults on startup when using canbus for angles.
- Starting in release 8.12.9, V and W output of the **RVP900** in PPP major mode, single polarization were always zero. IRIS-403
- The **tsview** utility was not showing the last range bin of the time series data. It also did not show the full **RVP900** bin count.
- **Netflash** was not signaling errors correctly.
- All the rda related programs, such as **rcp8**, and **rvp9**, were moved from `/usr/sigmet/bin/rda` to the normal `/usr/sigmet/bin`.
- Fix cases of blank ray segments in RDA **HydroClass**. IRIS-577
- Fixed the **RVP900** and **RVP8** warning "Trigger waveform was altered (Period)" when we are at the exact maximum PRF. IRIS-566

RDA 8.13.0 RELEASE NOTES (24 FEBRUARY 2012)

These notes cover changes made in RDA since release 8.12.9 of 15 July 2011. If you are upgrading from an earlier release, please read those notes also. Revised to svn [26895].

Important Upgrade Notes

- Please read the Important Upgrade Notes in the *IRIS 8.13.0 Release Notes*.
- *RCP8 Systems only*: If you are using the GPIB interface to talk to peripherals such as a signal generator, you need to upgrade your kernel module when upgrading. First remove the old rpms:

```
# rpm -e kmod-linux-gpib
# rpm -e linux-gpib-kmod-common
# rpm -e linux-gpib-lib
```

Then install the new rpms from the installation media, from the RHEL6/extras/RPMS directory:

```
# rpm -Uhv dkms-2* (Probably already installed)
# rpm -Uhv linux-gpib-lib-*
# rpm -Uhv linux-gpib-kmod-common-*
# rpm -Uhv dkms-linux-gpib-*
```

If you do not have the release dvd, you can download these from our ftp site

New Features

- The RVP900 now can compute new **dBTe** and **dBZe** data types. The “e” stands for “enhanced”. This is the dual-polarization cross-correlation power measurement. In other words, this is $|T_{0hv}|$ and $|R_{0hv}|$. See *IRIS 8.13.0 Release Notes*, New Features bullet 8 for more details. IRIS-442

Bug Repairs

- The **RVP900** was generating an incorrect trigger pattern when using an external trigger. This is fixed.
- The **RCP8** canbus interface was improved to support improved gear heating. Requires a solid state relay installed in the pedestal controlled by DI16 con2 pins 12(+) and 13(-). IRIS-301
- The **RVP900** was getting messed up when the firewall feature of Linux is turned on. It was computing an MTU of 0 between the computer and the IFRD. This is changed to return a minimum of 1500. IRIS-349

- Because of changes made to the size of stored time series in the **RVP900** and **RVP8**, it was necessary to increase the maximum shared memory size to 50 MB, from the default of 32MB. This is now done by the sigconfig script automatically at install time, and is documented in the *IRIS/RDA Software Installation Manual*. IRIS–339
- We improved the sigconfig script to correctly configure network device eth1 when we install an **RVP900**. IRIS–351
- We fixed a long standing bug in the **RCP8**. It seemed to only show up on RHEL6, and usually with the RVP900. It was seen on several radars running IRIS 8.12.9. The symptoms were:
 - The system runs for a day or two before failure.
 - IRIS stops recording data with no error message.
 - The **antenna** utility shows the antenna not moving.
 - On real radars, the antenna may still moving.
 - If you access the RCP8 using **antx**, the RCP8 and interface will lock up when you restart the threads.
- Fixed a bug in the **RCP8** on Klystron radars only. The RCP8 crashed occasionally with a Unix Segmentation fault in the klystron thread. Usually there has also been an “Unknown +message header” fault report from klystron thread before the crash. IRIS–390