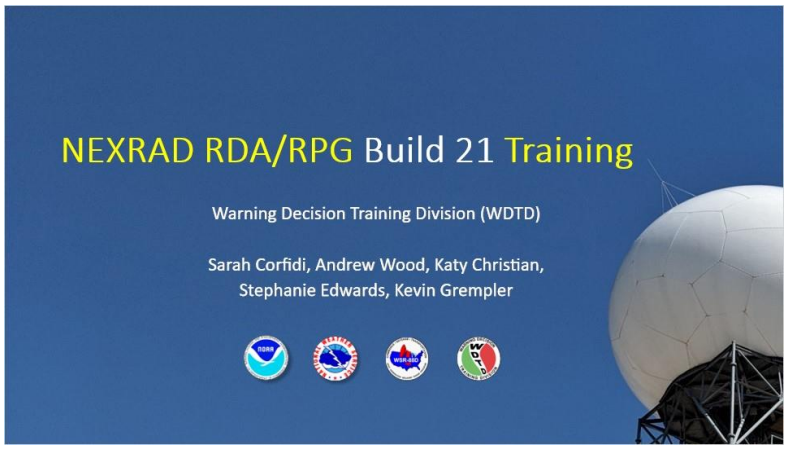
WSR-88D Build 21 Training

1. Build21_WSR-88D

1.1 NEXRAD RDA/RPG Build 21 Training



Notes:

Hello, and welcome to this training on major changes associated with the WSR-88D RDA/RPG Build 21. I'm Sarah Corfidi, an instructor with the Warning Decision Training Division. On behalf of the WDTD 88D Build team, I'll be guiding you through this lesson.

1.2 Navigation

Notes:

Before we begin, let's take a moment to review the navigation options. Click the markers for more information on what each option does. For example, the play/pause button will allow you to play or pause each slide. You can click the replay button to repeat a slide. Click the speaker button to adjust the volume. Click the acronyms tab at the top of the page if you want to review any of the acronyms mentioned in this lesson. Click the transcript tab if you want to read the narration for each page. In the upper right, the resources tab will allow you to view associated links and resources. Finally, click the previous button to review a slide or the next button to move forward.

Click the Next button when you are ready to continue.

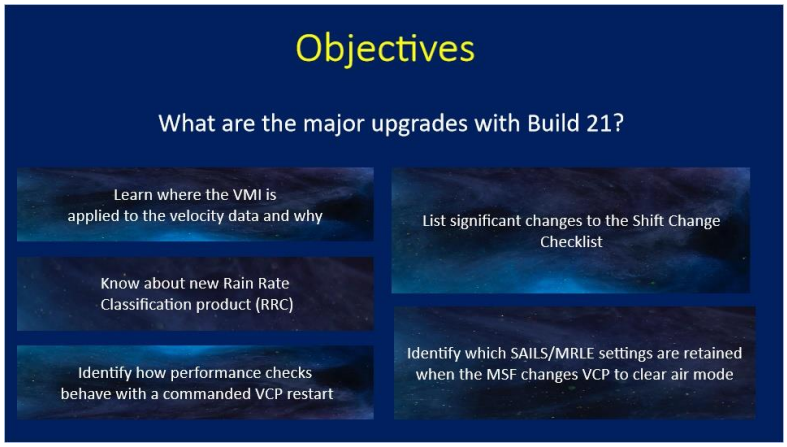
1.3 About the Instructor

Notes:

My name is Sarah Corfidi and I'll be your instructor for this lesson. If you have any questions while taking this lesson, please feel free to contact me.

If you need technical support or help with the Commerce Learning Center, please contact Andy Wood, who is listed on the screen.

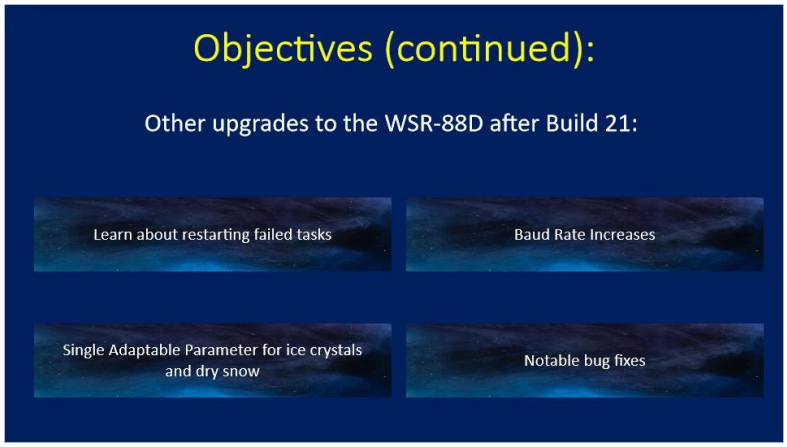
1.4 Objectives



Notes:

Let’s first review the objectives for this course. After taking this course, you will be able to list the major upgrades from Build 21. You will learn where the Velocity Measurement Increment (or VMI) is applied to the velocity data, know about the new Rain Rate Classification product, identify how performance checks behave with a commanded VCP restart, list changes to the Shift Change Checklist, and identify which SAILS/MRLE settings are retained when the Mode Selection Function (or MSF) changes the VCP to clear air mode.

1.5 Objectives (Continued)

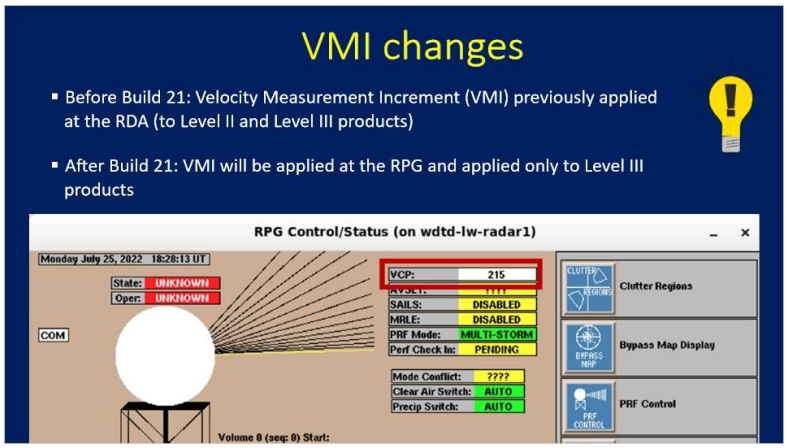


Notes:

Here are a few more objectives. You will also learn about restarting failed tasks, a single adaptable parameter for Ice Crystals and Dry Snow, Baud Rate increases, and a few notable bug fixes.

For your convenience, I've added a few of the many acronyms into an acronyms tab, so you can quickly recall what they mean. Let's get started!

1.6 VMI Changes



Notes:

Before this latest update, the VMI, or Velocity Measurement Increment, was previously applied at the RDA, and it was applied to both Level II and Level III data.

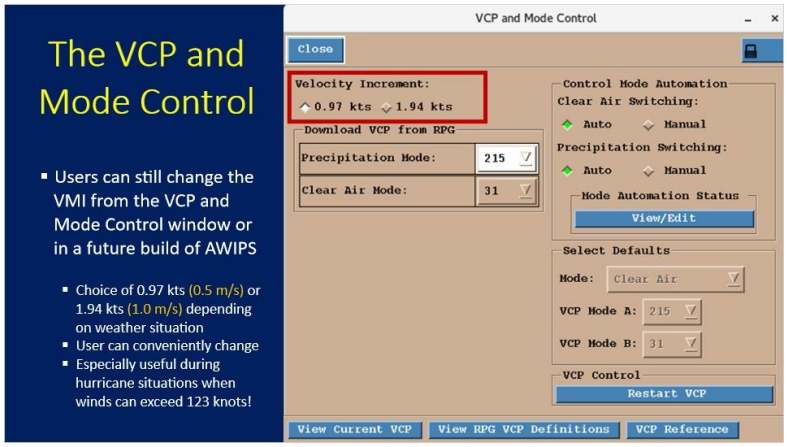
After this Build 21 upgrade, the VMI will be applied at the RPG and applied to the Level III (derived) radar products. Click the light bulb to learn more.

You may wonder why the ability to change the VMI is important. Well, as previously noted, before Build 21, when changing the VMI, the velocity resolution was applied at the RDA and was thus applied to both Level II and Level III products.

In previous builds, the resolution going into the RPG could be

either 0.5 m/s (which is 0.97 knots) or 1.0 m/s (which is 1.94 knots). Lower precision data can degrade velocity dealiasing quality. Since the velocity resolution will be now controlled by the RPG, the RDA will always send the higher precision data, (that is, the 0.5 m/s (0.97 knots) data) to the RPG!

1.7 The VCP and Mode Control



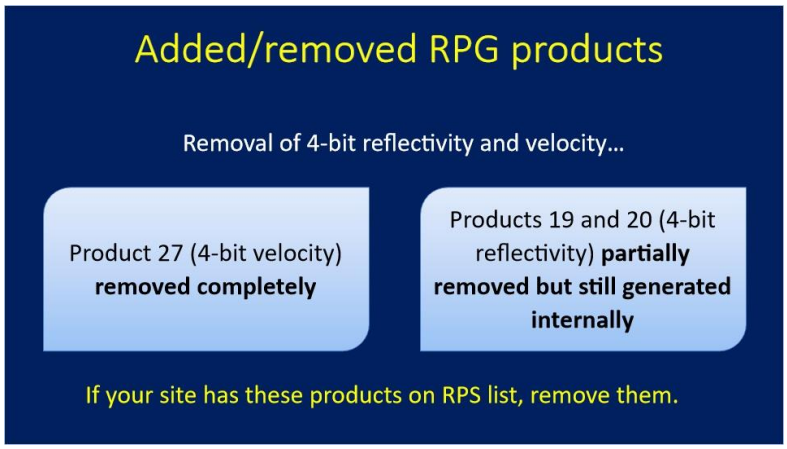
Notes:

After clicking on the “VCP” tab on the RPG HCI from the previous slide, here is what you will see on your end. You will be able to change the VMI from the VCP and Mode Control Window. Eventually you will be able to change it right from AWIPS, but that will be in a future build.

There are two choices depending on the weather situation- either 0.97 knots or 1.94 knots.

Users can conveniently make this change. You can imagine weather situations where this may be especially useful- for example, when a hurricane is approaching your CWA.

1.8 RPG products



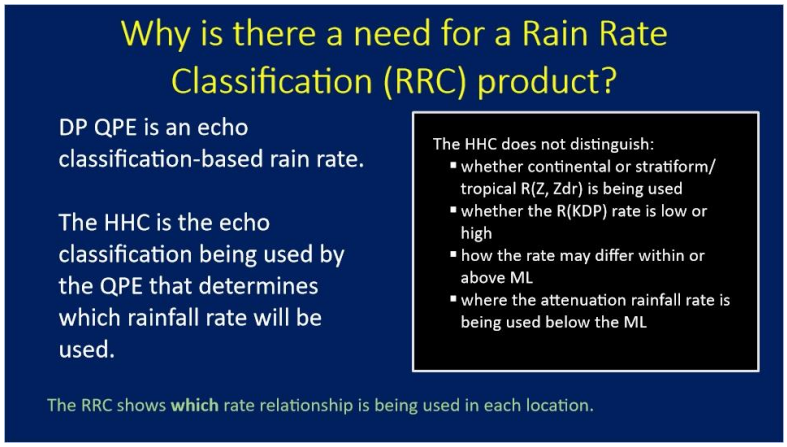
Notes:

There will be some RPS list changes with this new build as well.

The main headline is that 4-bit reflectivity and velocity are being removed. RPG products 19, 20, and 27, are not available any more in the RPS list. RPG product 27 is now completely removed, and it's not even created. RPG products 19 and 20 are still being created for use by the HCI's Clutter Censor Zone and PRF editor windows, but they are not distributed to any narrowband user (like AWIPS users).

The takeaway is that if your site still has these products on the RPS list, please remove them.

1.9 Need for a RRC product



Notes:

Now, let's talk about the New Rain Rate Classification Product.

Why is there a need for the RRC Product?

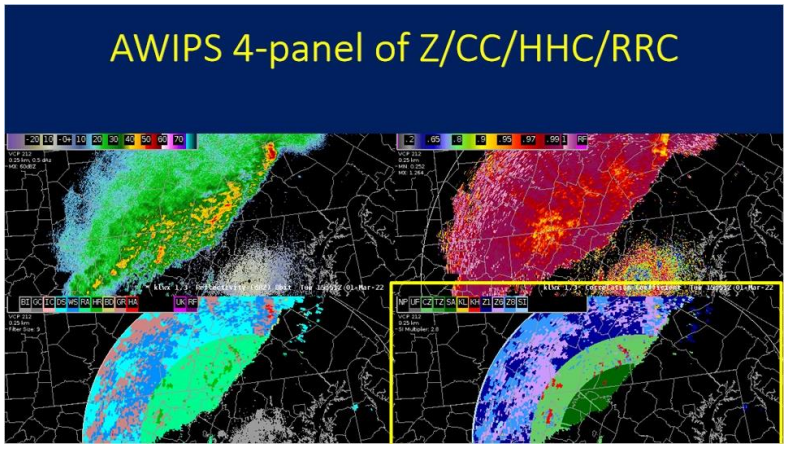
With the HHC, the rain rate class was applied relative to the melting layer. The problem was that users had to mentally keep track of melting layer information along with the hydrometeor classifications. That was quite challenging!

The new RRC product makes it easier for forecasters.

The DP QPE is an echo classification-based rain rate. The HHC is the echo classification being used by the QPE algorithm that, along with location with respect to the melting layer, determines which rainfall rate relationship is going to be used. But, the HHC doesn't distinguish whether the continental or stratiform/tropical rain rate equation is being used. It also doesn't show where the R(KDP) rate is low (for a rain/hail mixture) or high (for heavy rain).

Furthermore, the HHC doesn't show how the rate may differ within or above the melting layer (for dry snow or for a rain/hail mixture). Finally, the HHC doesn't show where the attenuation rainfall rate is being used below the melting layer. In contrast, the RRC shows which rate relationship is being used in each location.

1.10 AWIPS 4-panel example



Notes:

An example of the RRC (hybrid rain rate classification) product is shown here. The RRC product will be available at some point in AWIPS. You can see the new RRC product in the lower right panel.

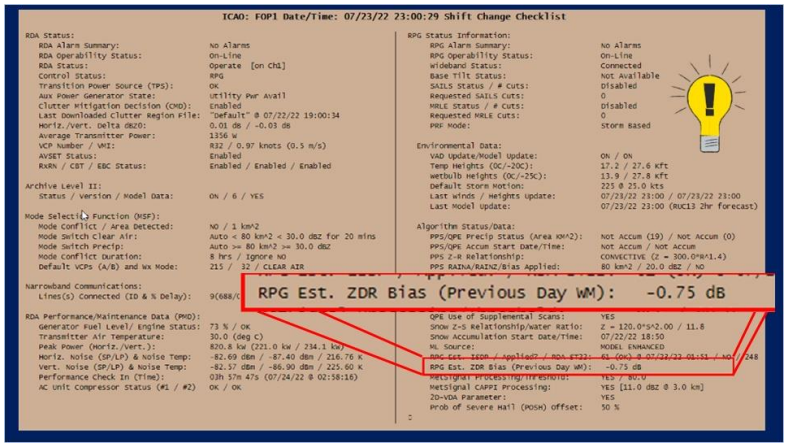
1.11 Table for RRC

Display	Color	Meaning
NP	black	No Precip *(includes Biota and No Echo)*
UF	gray	Unfilled bin *(Missing/Unknown)*
CZ	light green	Convective R(Z,ZDR)
TZ	medium green	Tropical R(Z,ZDR)
SA	dark green	Specific attenuation rainfall rate, R(A)
KL	yellow	R(KDP) with 25 coefficient for rain/hail mixture
KH	red	R(KDP) with 44 coefficient for heavy rain
ZI	dark blue	R(Z) *(the default rate relationship)*
Z6	lavender	R(Z) * 0.6
Z8	medium blue	R(Z) * 0.8
SI	light blue	R(Z) * multiplier (ice crystals & dry snow above the ML), which is site-adaptable between 1.0 and 2.8

Notes:

The table on screen displays labels and colors for the rain rate classification.

1.12 SCL- ZDR Bias



Notes:

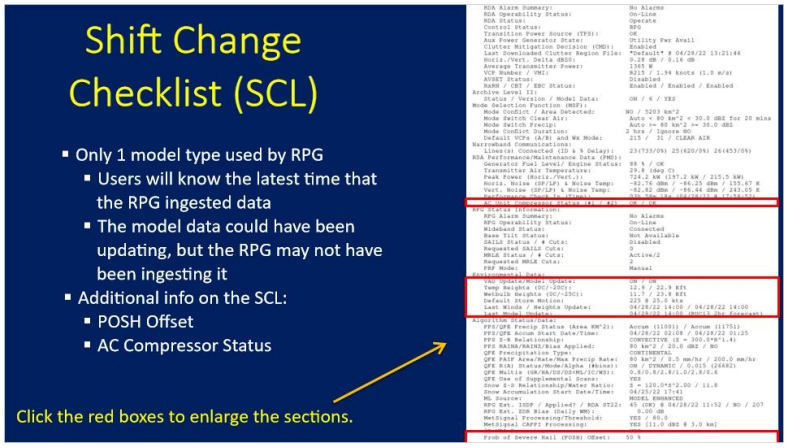
Now let’s talk about the Shift Change Checklist. This image may look different from what your shift change checklist looks like, but the information is the same. There are a few changes you should be aware of.

The shift change checklist now contains a ZDR Bias estimate value which is computed from the previous day's ZDR Bias estimates. Users have been able to monitor the ZDR bias via their Data Quality Dashboard, and that's still a better way of looking at trends in ZDR bias. The SCL provides another way to monitor ZDR bias trends. Click the lightbulb to learn more.

You may wonder why the ZDR bias is significant. Differential Reflectivity is a dual-pol variable that is important to determining hydrometeor characteristics. Significant ZDR biases can affect hail size algorithms as well as precipitation estimates.

You may see positive numbers or negative numbers for the ZDR bias. A value of –99 means the ZDR bias was missing. A positive ZDR bias may cause an underestimate for the QPE. Conversely, a negative ZDR bias may cause an overestimate for the QPE. The acceptable range for ZDR bias is between -0.2 dB to positive 0.2 dB.

1.13 SCL - Environment

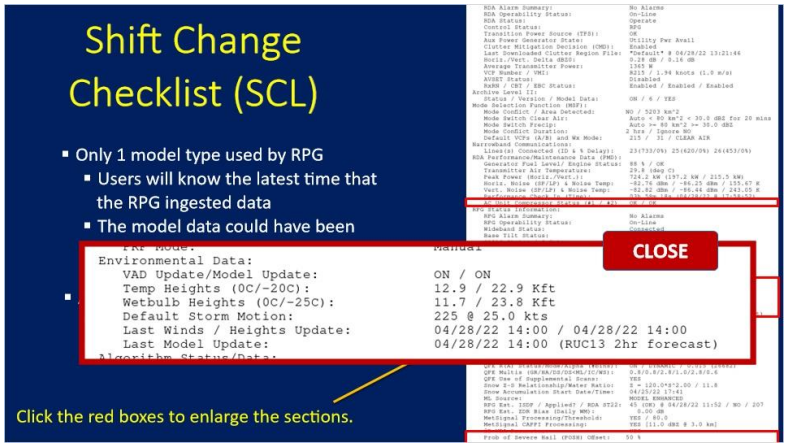


Notes:

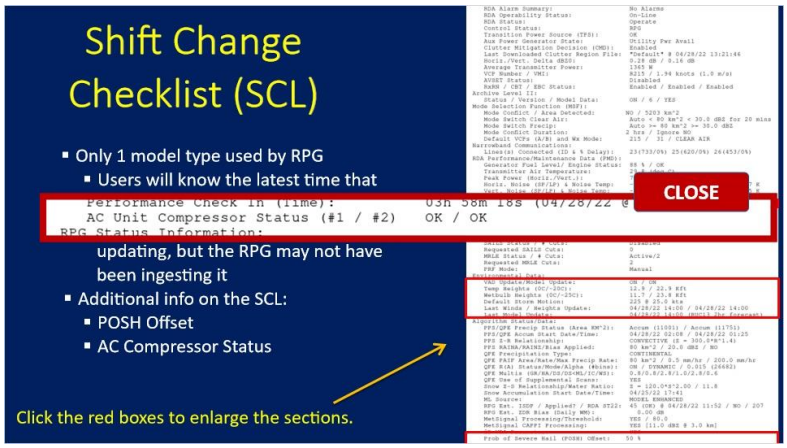
Here are a few other tidbits from the Shift Change Checklist. There is only 1 forecast model used by the RPG, and that's the RAP13. In this enhancement, you will know the last time that the RPG ingested model data to update the VAD and Environmental Tables. The model data could have been updating but the RPG may not have been ingesting it.

Some additional information will be available on the Shift Change Checklist. A POSH offset was added, and here's one all the El Tech's out there will appreciate: the Air Conditioner compressor status was added as well.

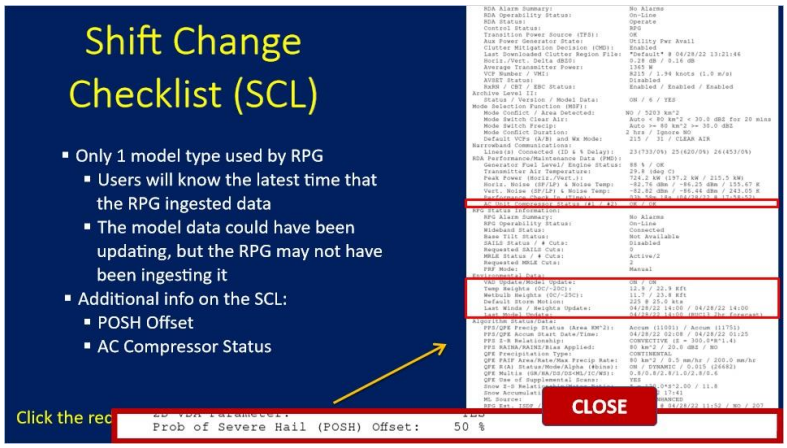
zoomy (Slide Layer)



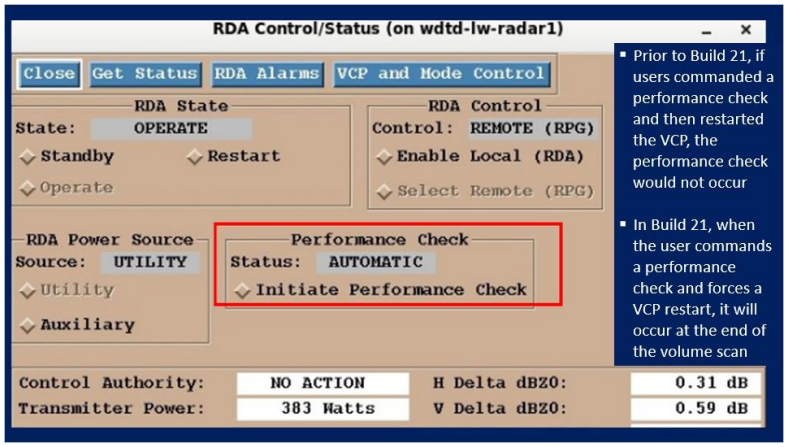
zoomy2 (Slide Layer)



zoomy3 (Slide Layer)



1.14 Performance Check

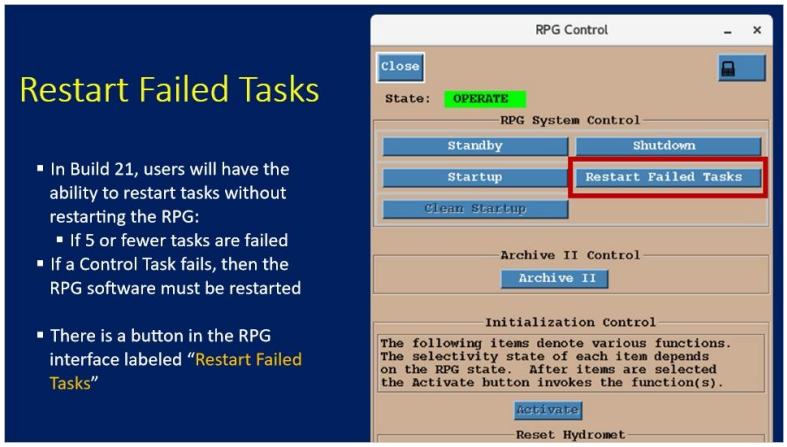


Notes:

There are a few changes to the performance checks. Before Build 21, if users commanded a performance check and also changed the VCP, then the performance check would not run.

However, in Build 21, when the user commands a PC and forces a VCP restart, it will occur as soon as possible once the current volume scan is completed.

1.15 Restart Failed Tasks



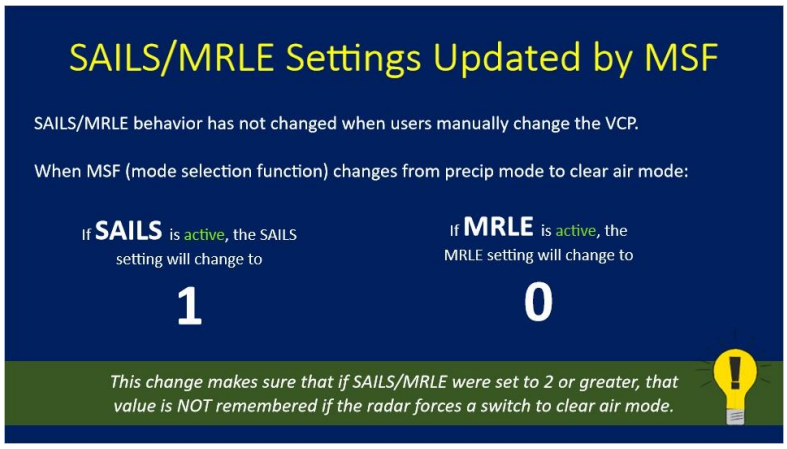
Notes:

Prior to Build 21, a user would have to restart the entire RPG in order to clear the task failure. The exception to this rule was velocity dealiasing “veldeal” which would restart anytime it failed.

Now, in Build 21, users will have the ability to restart tasks without restarting the RPG, if 5 or fewer tasks are failed. However, if a control task fails, then the RPG software must still be restarted.

There is a button in the RPG interface where the user can just click the “restart failed tasks” button as shown here.

1.16 SAILS/MRLE Settings



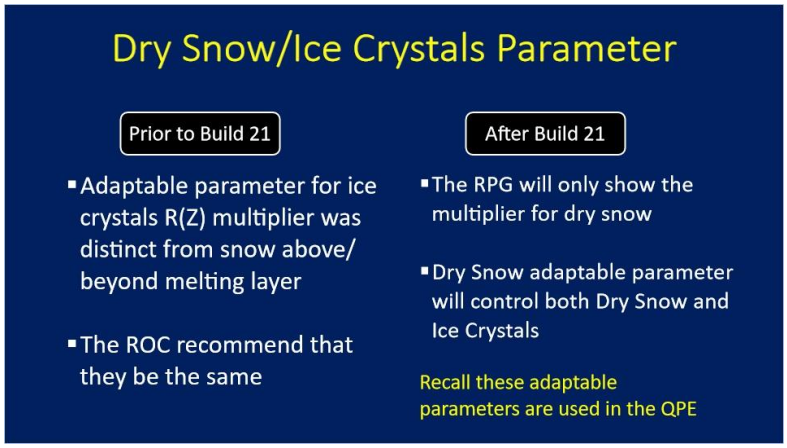
Notes:

Now let’s discuss some important changes with SAILS and MRLE settings. Up until Build 21, the control of SAILS/MRLE has been exclusively a user interaction with no automation. The important thing to remember is that SAILS/MRLE behavior has not changed when users change the VCP.

This change has to do with what SAILS or MRLE settings will be retained if the mode selection function changes from precipitation to clear air mode. If SAILS is active when the radar switches into clear air mode, then the SAILS setting will change to 1. If MRLE is active, then the MRLE setting will change to 0. These settings will remain that way if the radar (or MSF) switches back to precipitation mode. Click the light bulb for more information.

The reason this matters is that if SAILS or MRLE were set to 2 or greater, that value is not remembered if the radar (or MSF) forces a switch to clear air mode. As always, users need to be aware of what SAILS/MRLE settings are active, and then determine the best setting for the current weather.

1.17 IC/Dry Snow Adaptable Parameter



Notes:

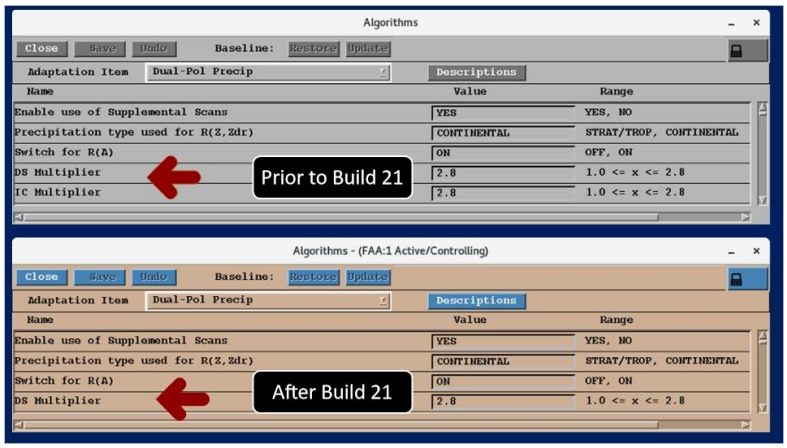
Prior to Build 21, the adaptable parameter for the ice crystal

multiplier was distinct from snow above and beyond the melting layer. However, it is recommended by the ROC that they be the same.

Now with Build 21, the RPG will just show the dry snow multiplier, and this will be the only visible adaptable parameter to the user. Know that the dry snow adaptable parameter will control the multipliers for both dry snow and ice crystals.

Recall these adaptable parameters are used in the QPE. Click the next slide to see some examples.

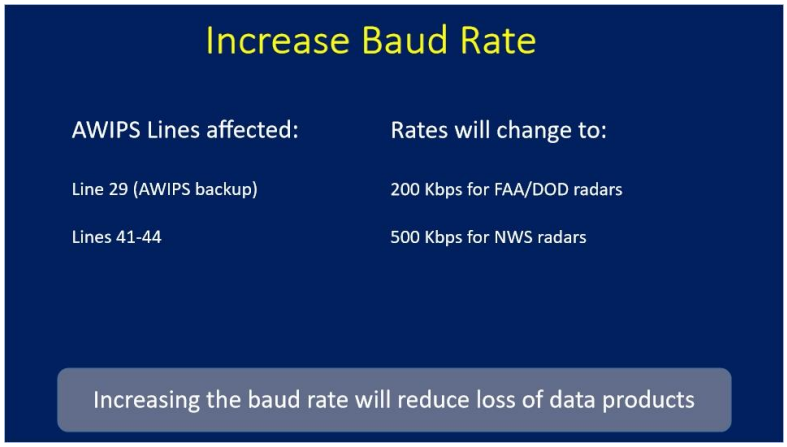
1.18 IC/DS Graphic examples



Notes:

The new windows for the adaptable parameters will look like this. Note that after Build 21, the user will only see “DS multiplier,” and there will be no entry for ice crystal multiplier.

1.19 Baud Rate increases

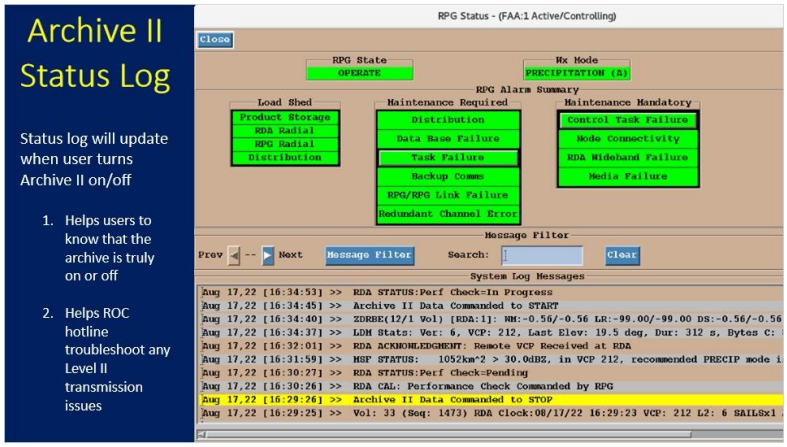


Notes:

Another change in the Build 21 update concerns the baud rates. The baud rate has been increased, which will affect the AWIPS backup lines, specifically Line 29. Lines 41-44 will also be affected.

The baud rates have remained set at 128 Kbps since Build 8.0! With Build 21, the rate will increase to 200 Kbps for FAA/DOD radars and 500 Kbps for NWS radars. The current baud rate is no longer sufficient for modern NWS RPS lists. The load shedding that occurs with lower baud rates results in a loss of products to the SBN, NCEI, etc.

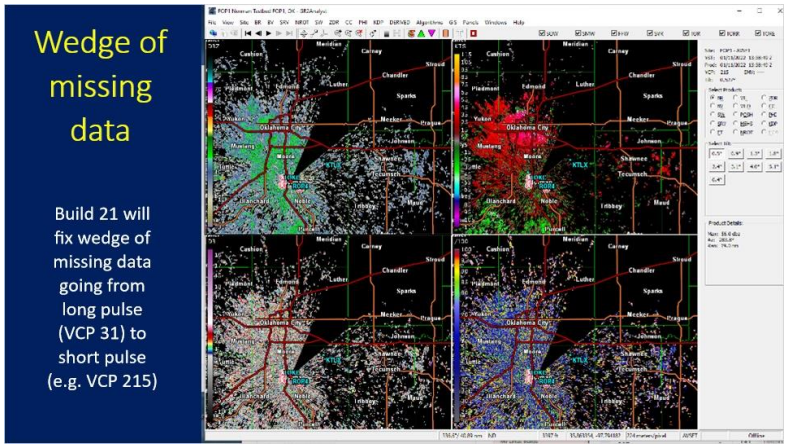
1.20 Archive II Status Log



Notes:

Another enhancement in Build 21 affects the status log. The status log will now update when the user turns Archive II on or off. This helps users to know that the archive is truly on or off. It also helps the ROC Hotline troubleshoot any Level II transmission issues.

1.21 Wedge of missing data



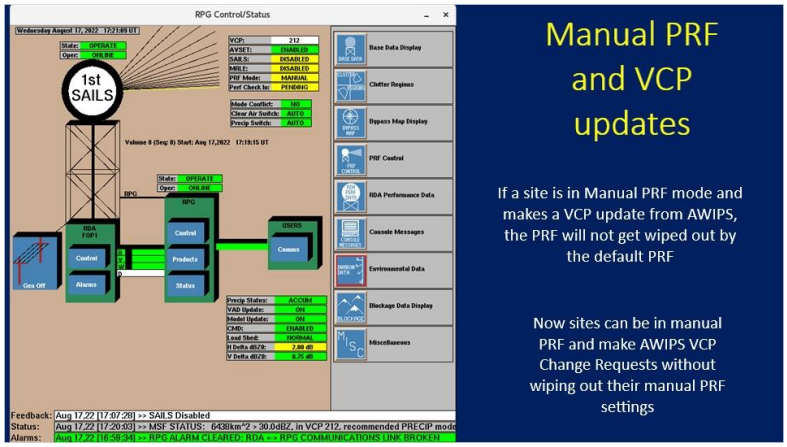
Notes:

Let’s finally talk about some notable bug fixes with Build 21. One

of the most important fixes is this one.

There has been a wedge of missing data when going from long pulse to short pulse. With Build 21, this will be fixed and this will affect all radar sites, so this one is important.

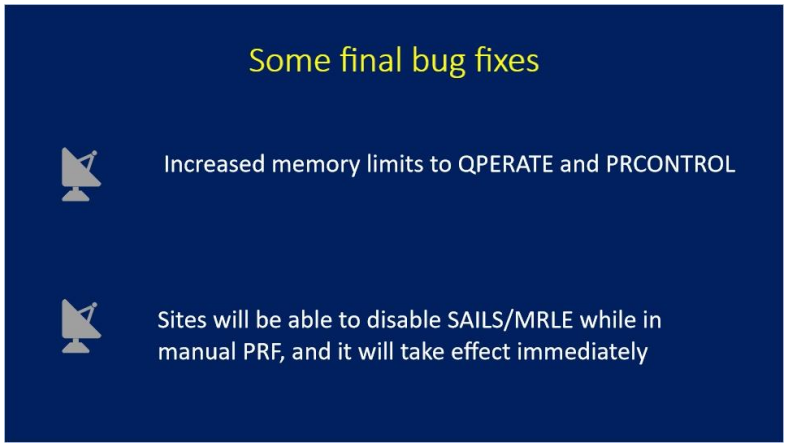
1.22 Manual PRF and VCP Updates



Notes:

Another fix in Build 21 (continued from Build 20.1) has to do with when a site is in Manual PRF mode and makes a VCP update from AWIPS – for example when you update SAILS- the PRF selected by the site will not get wiped out by the default PRF. The importance of this bug fix is that sites can be in manual PRF and make AWIPS VCP change requests without wiping out their manual PRF settings.

1.23 Some last updates



Notes:

Here are the last couple bug fixes. There are now increased memory limits to PRCONTROL and QPERATE. This is being done to prevent or at least reduce, these tasks from failing.

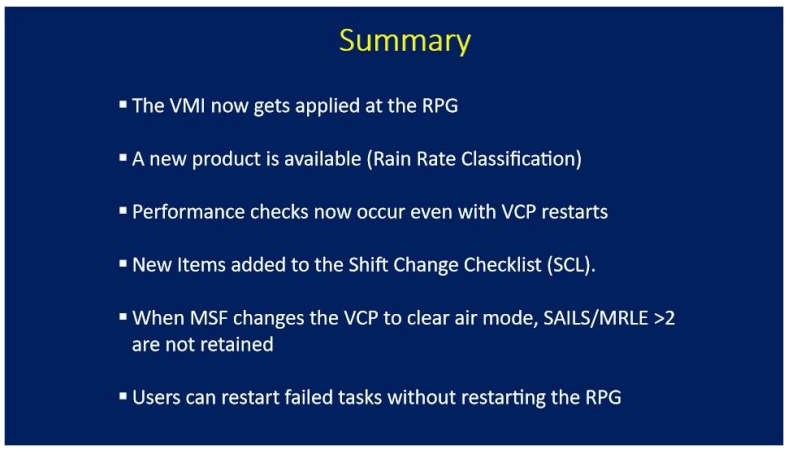
When a site is in Manual PRF, and they disable SAILS/MRLE, it actually won't disable it until another VCP download request is made (either manually or when the MSF forces a VCP change). With this bug fix, sites can disable SAILS/MRLE while in manual PRF and it takes effect immediately.

1.24 Acknowledgments

Notes:

I want to take a moment to thank all the people who helped add content to this lesson. Special thanks to the team members at the Radar Operations Center who provided images and technical feedback. Also, thanks to the WDTD Build 21 team and NWSTC team for reviewing this lesson and providing images and content.

1.25 Summary



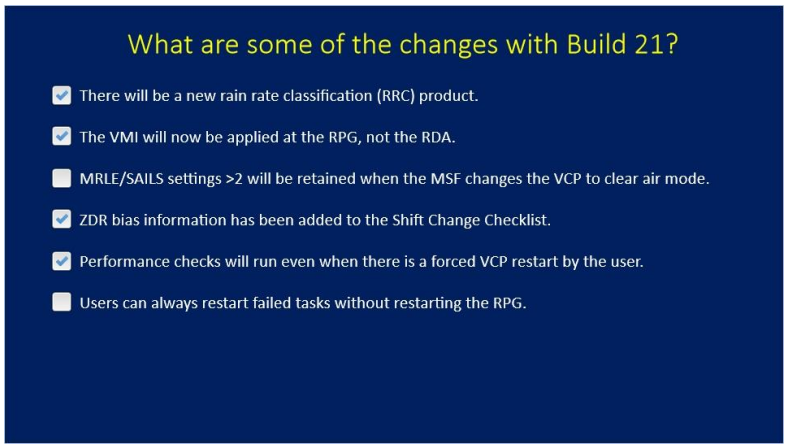
Notes:

Here is a summary of some of the major changes and upgrades to

Build 21. Please take a moment to review these changes. When you are ready, go to the next slide to complete an assessment. Thank you for your attention!

1.26 Question 1

(Multiple Response, 10 points, 2 attempts permitted)



Correct	Choice
X	There will be a new rain rate classification (RRC) product.
X	The VMI will now be applied at the RPG, not the RDA.
	MRLE/SAILS settings >2 will be retained when the MSF changes the VCP to clear air mode.
X	ZDR bias information has been added to the Shift Change Checklist.
X	Performance checks will run even when there is a forced VCP restart by the user.
	Users can always restart failed tasks without restarting the RPG.

Feedback when correct:

That's right! The main changes are: there will be a new RRC product, the ZDR bias information will be added to the SCL, the VMI will be applied at the RPG rather than the RDA, and performance checks will run even if there is a forced VCP restart.

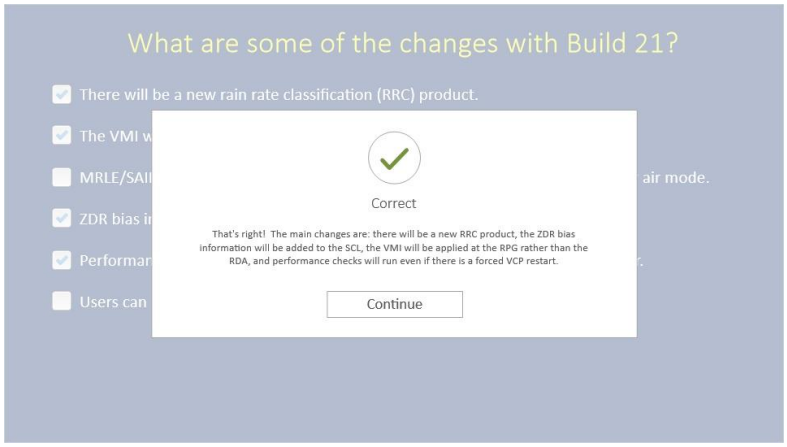
Feedback when incorrect:

Recall that in Build 21, that if the MSF changes the VCP to clear air mode, MRLE/SAILS settings >2 will not be retained. Also, the restart failed tasks will only work if 5 or fewer tasks are restarted or if the failed task is not a Control Task.

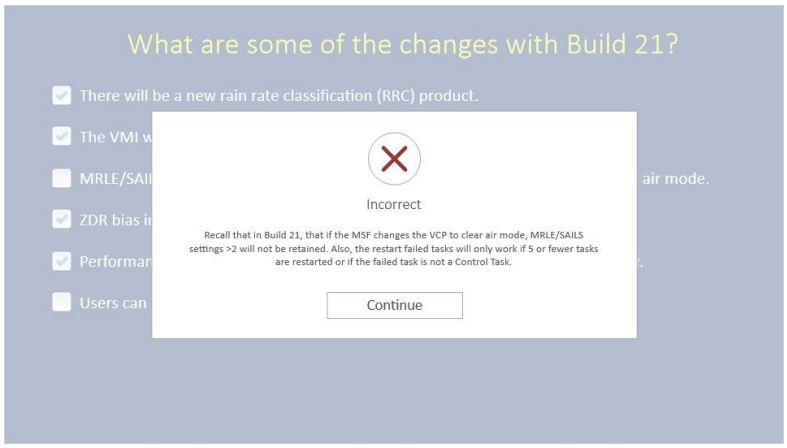
Notes:

What are some of the changes with Build 21?

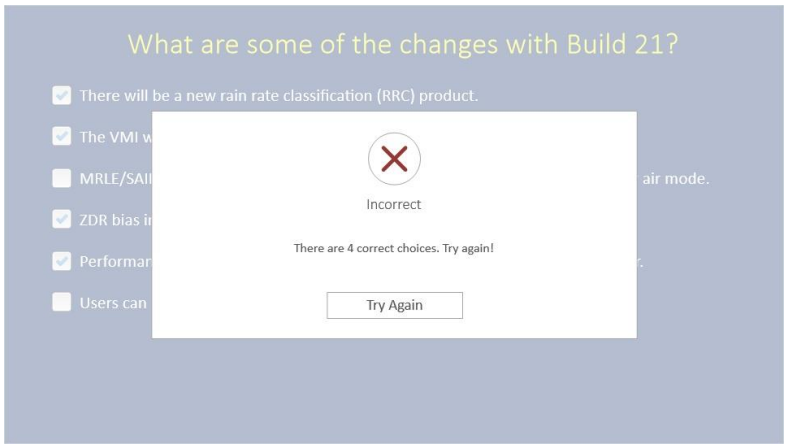
Correct (Slide Layer)



Incorrect (Slide Layer)

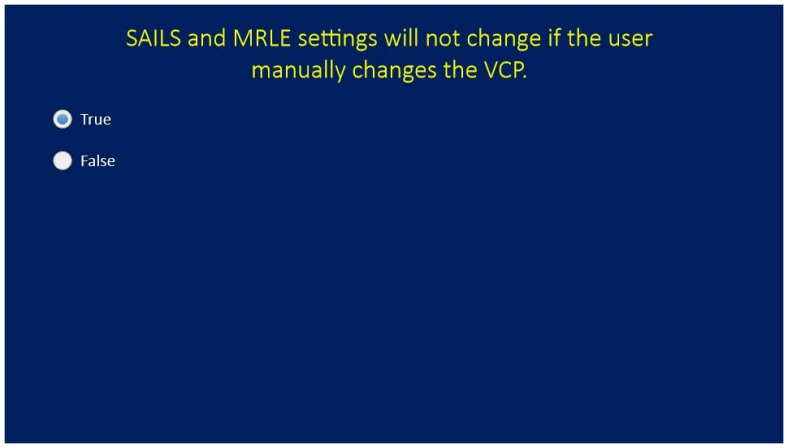


Try Again (Slide Layer)



1.27 Question 2

(True/False, 10 points, 1 attempt permitted)



Correct	Choice
X	True
	False

Feedback when correct:

That's right! You selected the correct response. Remember that the SAILS/MRLE settings will change if the MSF (mode selection function) changes from precipitation mode to clear air mode.

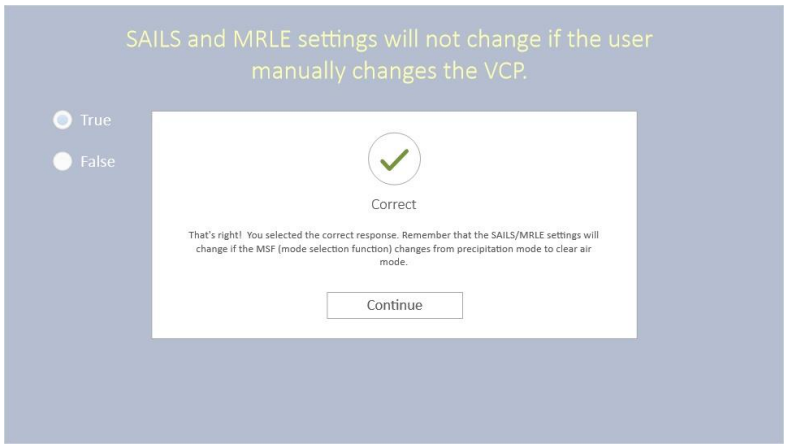
Feedback when incorrect:

Remember, the SAILS/MRLE behavior will not change if the user manually changes the SAILS/MRLE settings. When the MSF (mode selection function) changes from precipitation mode to clear air mode, if SAILS is active, then the setting will change to 1. If MRLE is active, the setting will change to 0.

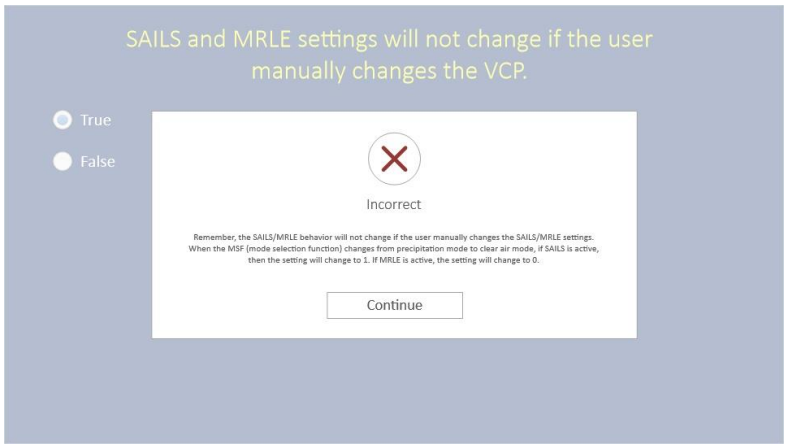
Notes:

SAILS and MRLE settings will not change if the user manually changes the VCP.

Correct (Slide Layer)

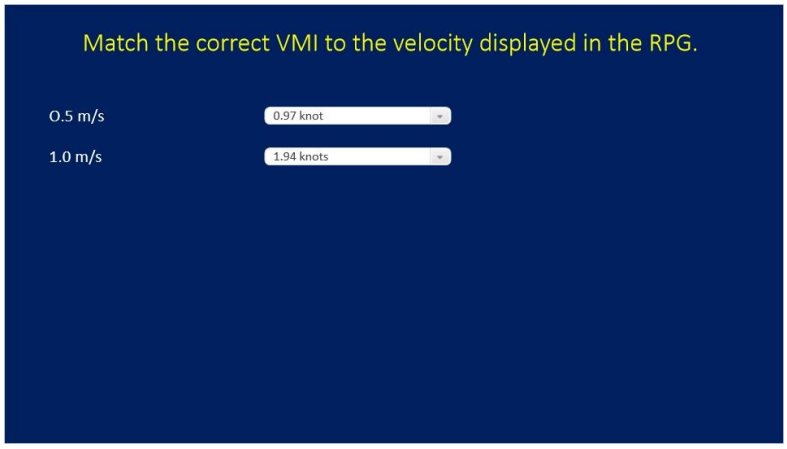


Incorrect (Slide Layer)



1.28 Question 3

(Matching Drop-down, 10 points, 1 attempt permitted)



Correct	Choice
O.5 m/s	0.97 knot
1.0 m/s	1.94 knots

Feedback when correct:

That's right!

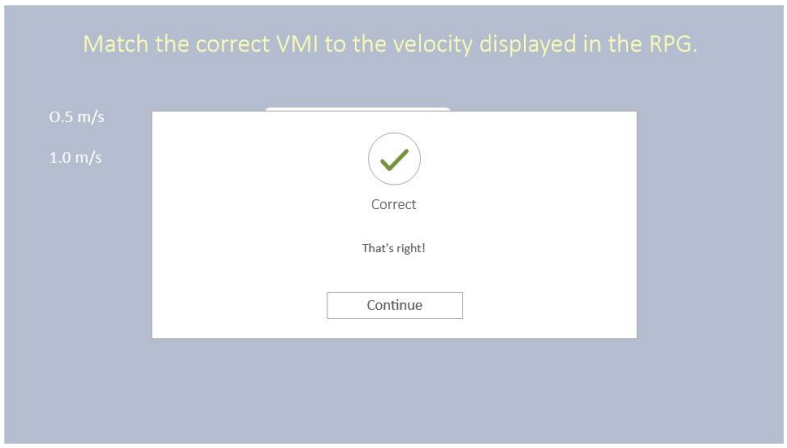
Feedback when incorrect:

Recall that 1 knot equals approximately 0.51 m/s. So 0.5 m/s is approximately 0.97 kt and 1.0 m/s is approximately 1.94 kts.

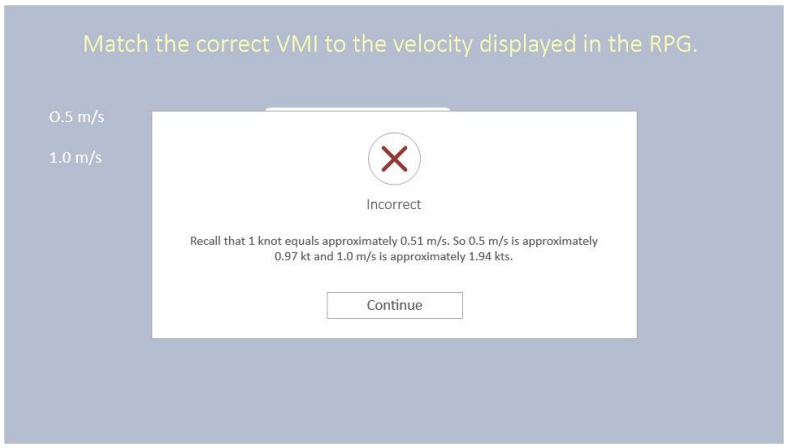
Notes:

Match the correct VMI to the velocity displayed in the RPG.

Correct (Slide Layer)

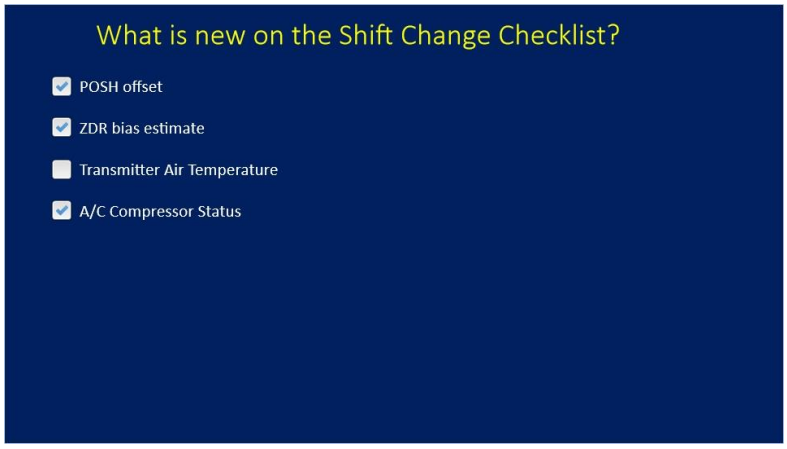


Incorrect (Slide Layer)



1.29 Question 4

(Multiple Response, 10 points, 2 attempts permitted)



Correct	Choice
X	POSH offset
X	ZDR bias estimate
	Transmitter Air Temperature
X	A/C Compressor Status

Feedback when correct:

That's right! You selected the correct response. The POSH offset, ZDR bias info, and A/C Compressor Status are new additions to the Shift Change Checklist in Build 21.

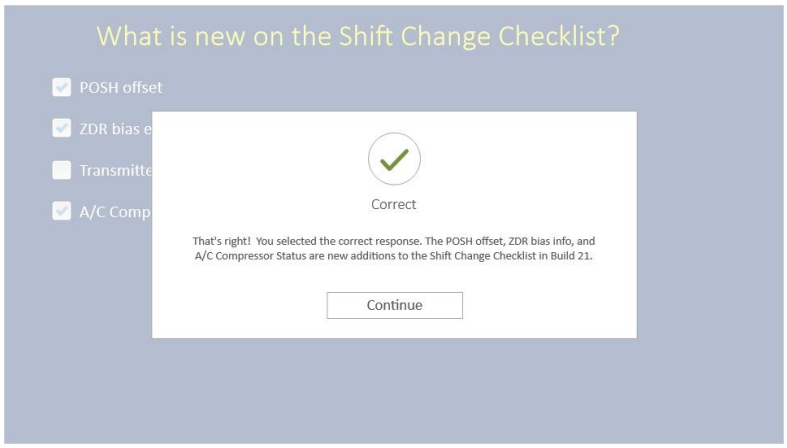
Feedback when incorrect:

Recall that the transmitter air temperature is already included on the SCL. It is not new in Build 21. The correct answers are POSH offset, ZDR bias estimate, and A/C Compressor Status.

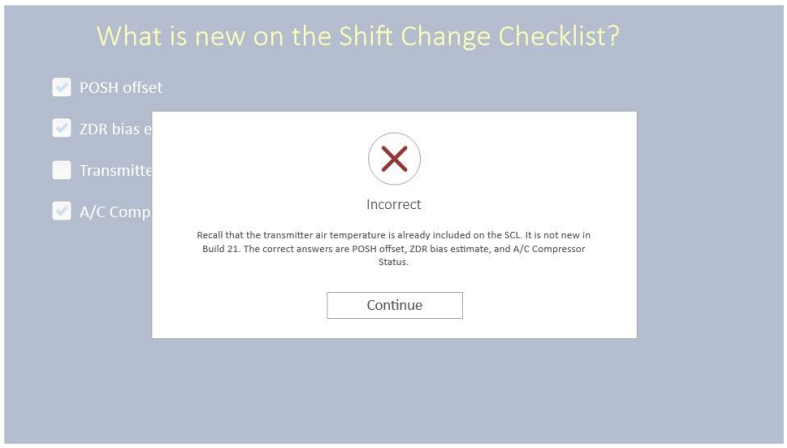
Notes:

What is new on the Shift Change Checklist?

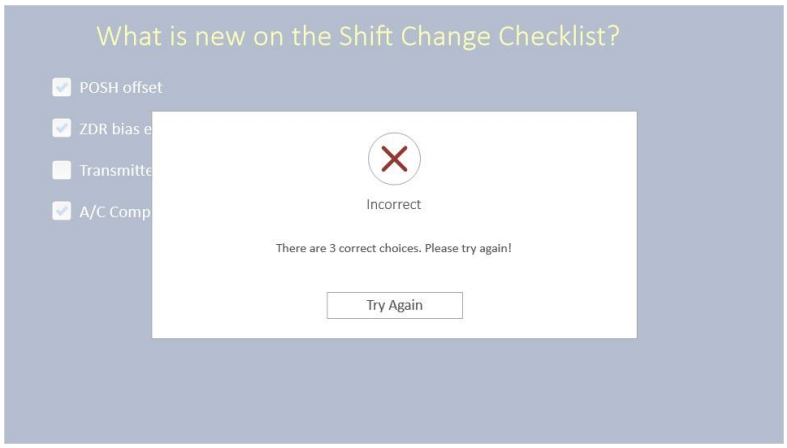
Correct (Slide Layer)



Incorrect (Slide Layer)

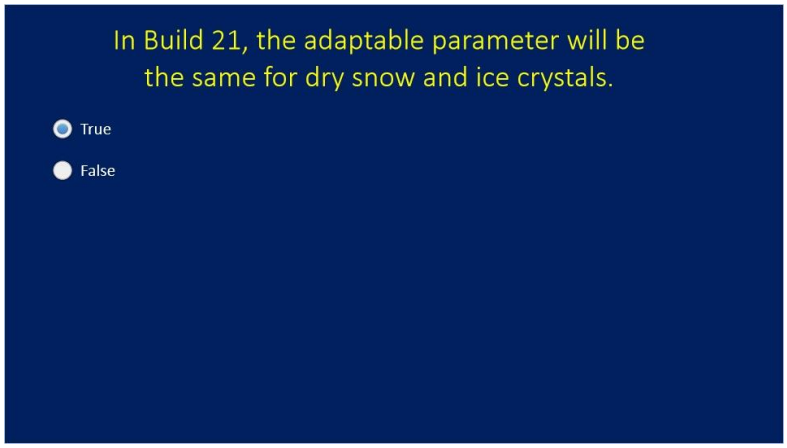


Try Again (Slide Layer)



1.30 Question 5

(True/False, 10 points, 1 attempt permitted)



Correct	Choice
X	True
	False

Feedback when correct:

That's right! You selected the correct response. Recall that the user will only be able to see the adaptable parameter for dry snow, and it will appear as “DS multiplier”. However, the adaptable parameter for ice crystals will be the same for dry snow.

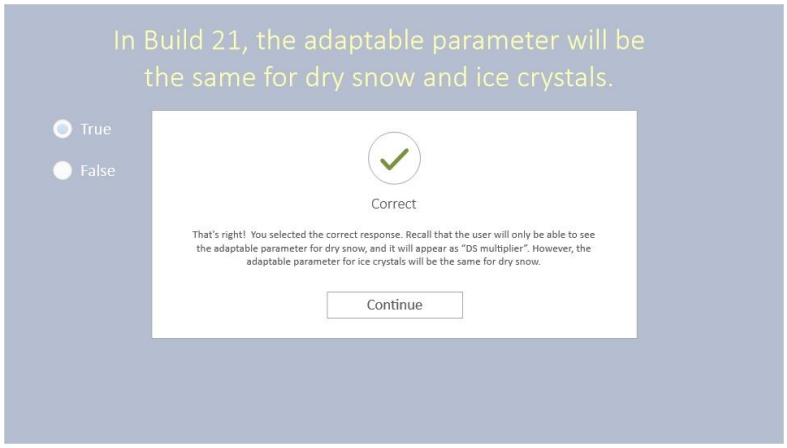
Feedback when incorrect:

Remember that in Build 21, there will be only 1 adaptable parameter for dry snow and ice crystals. It will appear as “DS multiplier”.

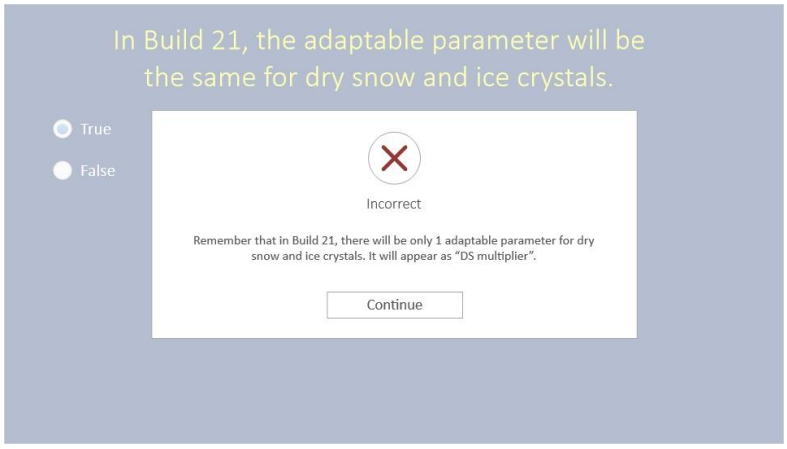
Notes:

In Build 21, the adaptable parameter will be the same for dry snow and ice crystals.

Correct (Slide Layer)

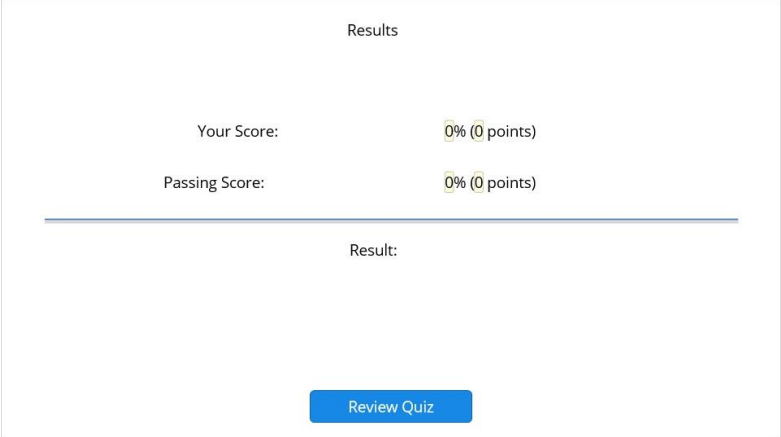


Incorrect (Slide Layer)



1.31 Results Slide

(Results Slide, 0 points, 1 attempt permitted)



Results for
1.26 Question 1
1.27 Question 2
1.28 Question 3
1.29 Question 4
1.30 Question 5

Result slide properties

Passing Score	80%

Notes:

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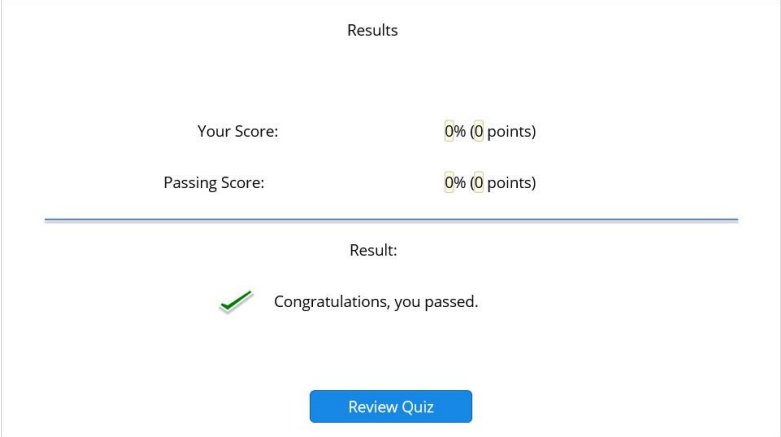
Success (Slide Layer)



Failure (Slide Layer)