

Implementing issues - iGrade alone

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Troubleshooting performance.

Symptoms:

- Implement responds too slowly to changes in grade
- Blade fails to hold grade
- Unexpected shifts in blade elevation occur
- Implement appears not to respond to commands
- Cross slope not working
- Cross slope behaving unexpectedly

Cause:

“Performance” is a subjective term. There are many ways in which a system can suffer poor “performance”. Thus there are also many causes for this. The exact cause will differ with the type of performance degradation present. Specific types will be discussed further in other parts of this document. However the below advice is almost always relevant.

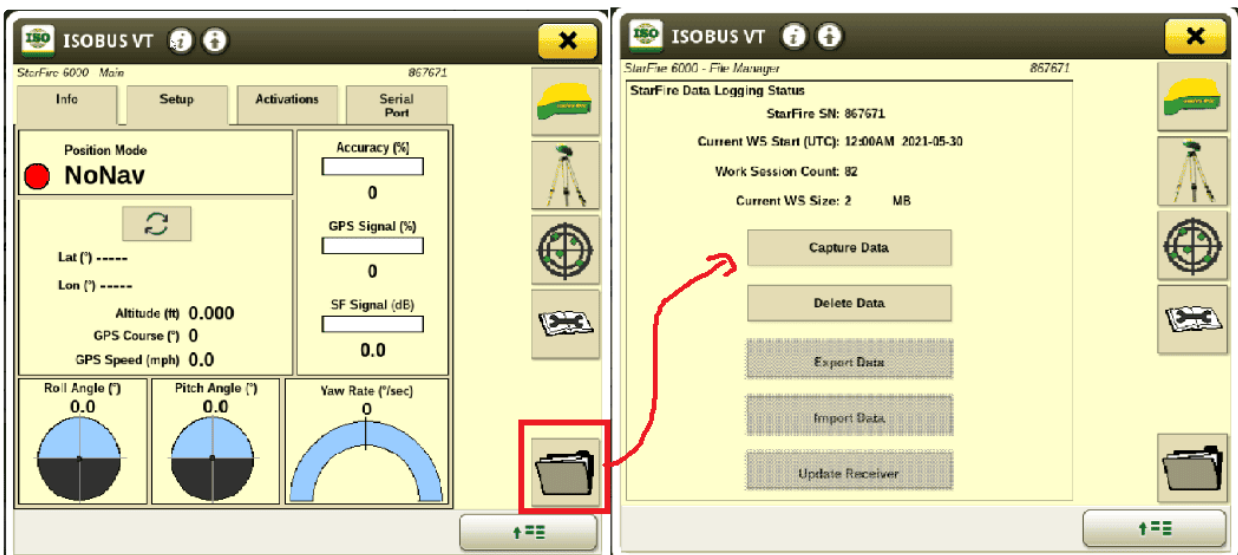
Solutions:

The first step when diagnosing any performance issue is to disconnect the T3RRA software and to test iGrade *in isolation*. Only once you have confirmed that iGrade is working properly, you can then start to troubleshoot the T3RRA software. Place iGrade in Plane Control or Grade Control and establish that it is performing as expected. If it is, reconnect the T3RRA software and continue

with other solutions in this troubleshooting guide. If it isn't please consult your John Deere dealer.

Implementing issues with iGrade (will occur without T3RRA connected)

NOTE: There will be situations where your dealer may ask you to capture a StarFire message log for further diagnosis. This can be done on the Deere display using the SF6000 VT as follows:



Bi-Directional error in iGrade.

Symptoms:

The implement consistently cuts when heading in one direction and fills in the other direction. Final grade is never achieved. If T3RRA software is halted and iGrade is run in 'Plane Control' only the problem is still present. Changing height control to SCV 3 may resolve the issue.

Cause:

This problem has been seen in cases where check valves within the tractor SCVs are malfunctioning. The implement blade is failing to hold height properly. The bidirectional nature of the issue perhaps comes from different amounts of dirt (weight) within the scraper when it is going in different directions. If changing height control to SCV 3 fixes the issue then it may indicate that only SCV 1 is malfunctioning.

Solutions:

Replace check valves with tractor SCVs.

Blade continuously loads on one side.

Symptoms:

System is grading low on one side.

Cause:

There are multiple possible causes for this.

- **iGrade has not been set correctly.**
- **SCV's have been put accidentally in float instead of detent.**
- **Manual nudge controls have been turned on by accident.**

Solutions:

1. **Ensure this is actually the case, try grading in both directions along a single pass be sure to confirm the blade stays low on one side**
2. **Be sure the SCV is set to the auto detent position**
3. **If using 'Cross Slope', ensure 'Cross slope' is set to control. Auto is active when the manual slope nudge buttons are greyed out. The blade controls the set slope when the slope nudge buttons are active. Check the iGrade setup - ensure cross-slope is set to remote commands and also SCV3 is set to cross slope for external commands,**
4. **Complete a TCM calibration on the receiver, be sure to drive a complete figure eight to wake up the TCM before**

completing the calibration, ensure the blade is close to the ground and level before proceeding through each step of the TCM cal.

- 5. If there are two receivers on the one scraper, check to see that the Implement GPS Receiver Offsets are set correctly in iGrade.**

Poor “on grade” performance.

Symptoms:

Blade Struggling to hold grade.

Cause:

There are multiple possible causes for this issue.

- **Interruptions to GPS.**
- **Incorrect surface offset.**
- **Incorrect settings in iGrade.**

Solutions:

1. **Disconnect T3RRA software. Perform performance tests using iGrade alone to simplify. After you are satisfied with the iGrade performance, reconnect T3RRA software and re-evaluate performance.**
2. **Be aware of your environment, GPS can experience interference from trees, buildings, the tractor, water and some soil types can cause interference.**
3. **Ensure the base is set up clear of trees and obstructions of its view of the sky.**
4. **Ensure the base is set up well clear of any traffic or vehicles passing by.**
5. **Ensure GPS accuracy is adequate, ensure you are operating within 1 mile (1.6kms) of your base station.**

6. **Check the GPS accuracy is adequate, Ensure your VDOP is below 1.6, do this by either opening the GPS info window in T3RRA Cutta by tapping the GPS in the lower right of the display.**
7. **Ensure the settings in iGrade are correct and re-calibrate iGrade thresholds and set the grade sensitivity. Calibrate thresholds using a potentiometer or a pressure gauge. See dealer for details.**
8. **Check your base has adequate power and is configured as an absolute base, low base power when set as a quick base can cause strange results.**
9. **If using a StarFire 3000 be aware that John Deere recommended practice is to use an external antenna. Check that the coaxial cable is not squashed or damaged.**
10. **Dealers are encouraged to file a John Deere DTAC case if vertical accuracy issues are not solved using other recommendations in this guide.**
11. **Also see - [The implement blade does not seem to follow the design surface.](#)**

Engaging auto causes the scraper to raise into the air.

Symptoms:

Operator engages scraper into detent (auto mode) and the scraper extends to full stroke on the lift cylinders.

Cause:

iGrade has Load Limiting and/or Max Cut enabled in Application controller settings.

The engine speed (RPM) threshold is set lower than the field working engine speed (RPM) threshold.

User is using UCC2 in Proprietary valve mode (CANBUS). But has the application controller also connected via the legacy option connector.

Solution:

Disable Load Limiting and/or Max Cut in Application controller settings.

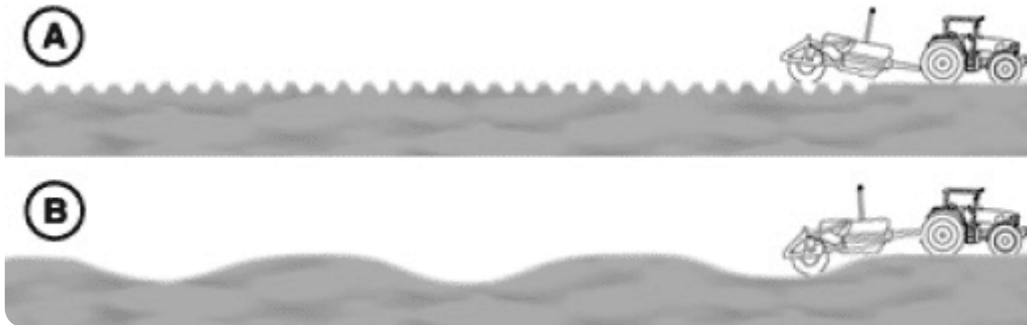
Enter an engine speed threshold that is greater than the factory default of 1500 rpm or make sure your working engine speeds are greater than your current load limiting engine speed.

Disconnect the legacy valve mode SCV connector at the application controller.

Scraper is “washboarding”.

Symptoms:

Scraper causes a washboard effect.



A-If washboarding is close together, flow rate is too high.

B- If washboarding is far apart, flow rate is too low.

Cause:

- **SCV flow rate is set too high or too low.**
- **Washboarding can occur when the blade is at an overly aggressive angle (construction model scrapers have a more aggressive angle while 'finishing' scrapers do not).**
- **It can occur when the ground is hard and has not been prepped for dirt moving.**
- **It can also occur when the tires' air pressure on the scraper does not match (one is lower than the other).**
- **It can also occur if the scraper has split hydraulics and the cylinders controlling height over the right and left walking tandem are not equally pressurized (one cylinder may have a leak).**

- **It can also occur if the tractor hitch is mounted to the scraper drawbar too high or too low.**

Solutions:

Decrease or increase the SCV flow rate. If still present, adjust counterbalance valve pressure.

Contact implement service provider.

Implement blade moves to an extreme position when placed in Auto.

Symptoms:

When placing the machine in Auto, the implement's blade dives deep, climbs to full height, or tips fully to one side.

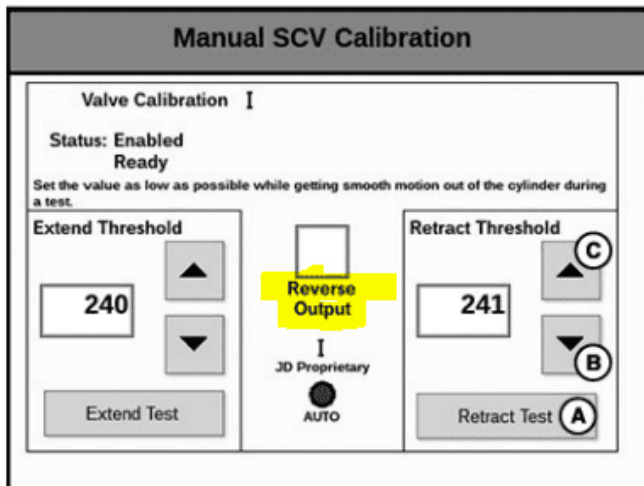
Cause:

SCV hoses are incorrectly configured (reversed).

UCC2 with JD proprietary mode configured for SCV control but JD Legacy "Option connector" is also connected to the tractor.

Solutions:

Short of altering the hydraulic hose configuration on the implement's cylinders, there is no known solution for iGrade v1. iGrade v2 also gives the option of reversing the outputs.



Ensure Option connector on rear of machine is disconnected, Then complete 2X power cycles to reset the SCV Controller

Blade not staying on grade & acting inconsistently.

Symptoms:

Blade is acting erratically.

Blade height is on grade for a while but then moves down a few inches and then back up.

Blade is reacting inconsistently while implementing. The blade wants to cut over ground that is already on grade.

When implementing design, the system is not cutting and filling as per map on screen.

Causes:

Base is being used as a Quick Survey base.

Base power is low.

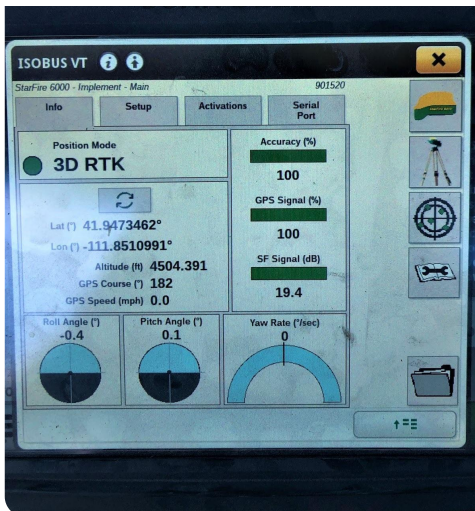
iGrade and/or application controller need to be updated.

This is related to the GPS receiver not being mounted correctly and not moving with the blade.

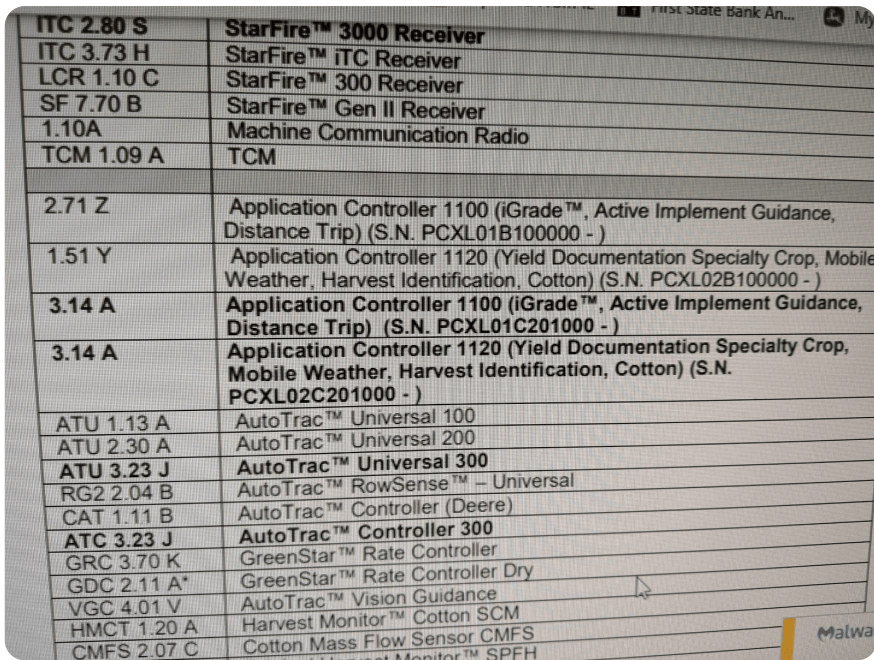
Solutions:

Use an Absolute Base.

Charge base to fullest amount.



Mount GPS receiver so that it moves with the blade.



ITC 2.80 S	StarFire™ 3000 Receiver
ITC 3.73 H	StarFire™ iTC Receiver
LCR 1.10 C	StarFire™ 300 Receiver
SF 7.70 B	StarFire™ Gen II Receiver
1.10A	Machine Communication Radio
TCM 1.09 A	TCM
2.71 Z	Application Controller 1100 (iGrade™, Active Implement Guidance, Distance Trip) (S.N. PCXL01B100000 -)
1.51 Y	Application Controller 1120 (Yield Documentation Specialty Crop, Mobile Weather, Harvest Identification, Cotton) (S.N. PCXL02B100000 -)
3.14 A	Application Controller 1100 (iGrade™, Active Implement Guidance, Distance Trip) (S.N. PCXL01C201000 -)
3.14 A	Application Controller 1120 (Yield Documentation Specialty Crop, Mobile Weather, Harvest Identification, Cotton) (S.N. PCXL02C201000 -)
ATU 1.13 A	AutoTrac™ Universal 100
ATU 2.30 A	AutoTrac™ Universal 200
ATU 3.23 J	AutoTrac™ Universal 300
RG2 2.04 B	AutoTrac™ RowSense™ – Universal
CAT 1.11 B	AutoTrac™ Controller (Deere)
ATC 3.23 J	AutoTrac™ Controller 300
GRC 3.70 K	GreenStar™ Rate Controller
GDC 2.11 A*	GreenStar™ Rate Controller Dry
VGC 4.01 V	AutoTrac™ Vision Guidance
HMCT 1.20 A	Harvest Monitor™ Cotton SCM
CMFS 2.07 C	Cotton Mass Flow Sensor CMFS

Contact your John Deere dealer and ask if updates are available for iGrade and/or application controller.

The implement blade does not seem to follow the design surface.

Symptoms:

The blade is moving up and down in ways that indicate that it is being successfully controlled. However the blade positions do not seem to be what is expected based on the design in T3RRA.

Cause:

iGrade is not in “Remote Control” mode. It may be in Plane Control, or Grade Control

Drain design bottom width is narrow and the implement is traveling outside the design width. The user is working outside of the drain bottom width design so the blade is not going to the design height.

Solutions:

Place iGrade in “Remote Control” mode and cycle power on the tractor. Consult your iGrade manual for instructions.

Increase the width of the drain bottom in Drain Design to accommodate the desired drain path.

Implement blade is intermittently jumping up or attempting to deep dive.

Symptoms:

Work is progressing normally but occasionally the blade will suddenly rise up, or attempt to aggressively dig.

Possible Cause:

- **A bad USB-to-Serial conversion dongle/adaptor is causing corrupted height commands to be sent to iGrade. This can be diagnosed by checking the I/O Voltages page on the iGrade display and observing the last received messages. Occasionally you may see values being received to be truncated or otherwise corrupted.**
- **Base receiver could have an intermittent failure. See [Sudden Vertical Shifts](#).**

Solution:

1. **Replace your USB-to-Serial cable with the one recommended. - FTDI US232R.**
2. **Contact T3RRA or your dealer for a recommended make and model.**



Ps

Erratic performance during drain implementation.

Symptoms:

1. **Implement moving erratically while implementing drains.**
2. **Implement moving erratically while implementing drains with Cross Slope enabled.**

Cause:

T3RRA creates a surface using a raster which is a grid of elevation heights. These gridded cells are referred to as “pixels” and have a uniform edge size. As the vehicle moves it reads the elevation from consecutive pixels beneath the blade. If the neighboring pixels are significantly different in elevation the blade can move substantially as it crosses pixel boundaries.

Solutions:

1. **In some situations, it may make sense to decrease pixel size so that neighboring pixels are closer in elevation. If your implement is 2 meters wide and your drain width is 4 meters, try decreasing your pixel size or increasing your drain width.**
2. **Disable Cross Slope.**

iGrade is indicating that Remote Commands are not being received from T3RRA software or indicating ‘No Surface Defined’.

Symptoms:

The iGrade display is showing a “No Remote Commands” error message, and iGrade is not controlling your implement.

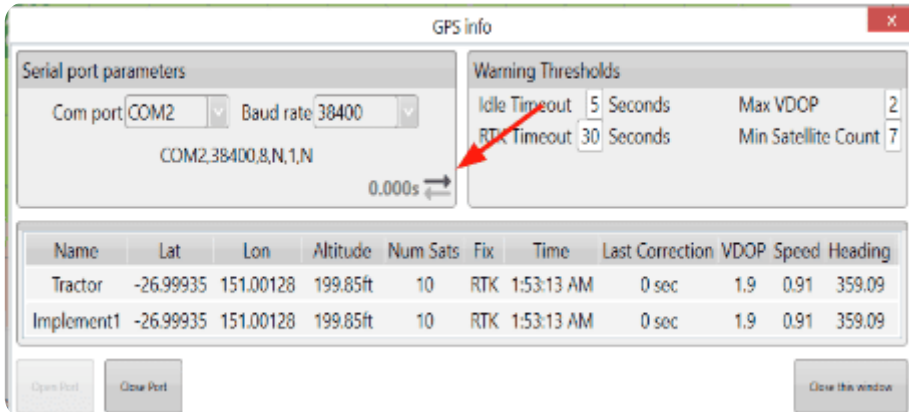
iGrade v2 displays “No Surface Defined” when moving.

Causes:

- **Your T3RRA software may not actually be sending control messages.**
- **If it is sending messages there may be a problem with the messages, or the cable may be incorrectly attached, or damaged.**
- **SCV’s have not been set to detent.**
- **iGrade is expecting Cross Slope commands but they are not being sent from T3RRA.**

Solutions:

1. **Check that you are in the ‘Implementation’ screen in your T3RRA software, and that you have pressed on the ‘Start’ button.**
2. **Check that the T3RRA software is not in ‘Demo’ mode.**
3. **Check that the data sending spinner is rotating (T3RRA v1) or the send arrow is flashing (T3RRA v2).**



4. **Check that your iGrade Remote Control Harness is in place and connections at both ends are well seated, and that no pins are damaged/pushed-in.**



5. **If you are using a USB-to-Serial**

dongle that has activity lights (recommended) check to see that the appropriate TX light is indicating activity.

6. **Make sure that your iGrade Remote Control Harness does not have reversed TX and RX lines. The iGrade manual describes the required pin configuration for this cable.**

Check that the pin configuration is correct.

- 7. Check continuity in your iGrade Remote Control Harness TX and RX lines to ensure that a pin has not become disconnected.**
- 8. Check the I/O voltages screen on the iGrade display to view the “Last Received Command”. If there are messages being shown it is possible that the messages are defective in some way. Take a photo of this screen and forward it to T3RRA or your dealer for diagnosis.**
- 9. Check that both iGrade and T3RRA are configured to send and receive Cross Slope commands (if using Cross Slope). If you are not using Cross Slope, check that both do not have Cross Slope enabled.**

Error from grade values do not match on iGrade and T3RRA software.

Symptoms:

When stationary, or at very low speeds, the value for error from grade reads 0 on the iGrade display. The error from grade value in the T3RRA software is non-zero and at the expected error value. As soon as you start moving the error value on iGrade returns to expected levels.

Cause:

At low speeds (below iGrade's activation speed) T3RRA software stops sending iGrade true target elevations. Rather, the T3RRA software returns the current blade height to iGrade. This is done as a safety measure to ensure that the blade will not move, as well as to keep the remote connection alive.

Solutions:

This is a software issue that is being investigated for alternative solutions. Ignore the error value on iGrade when stationary. Make sure your are updated to the latest software version as this problem may have been solved.

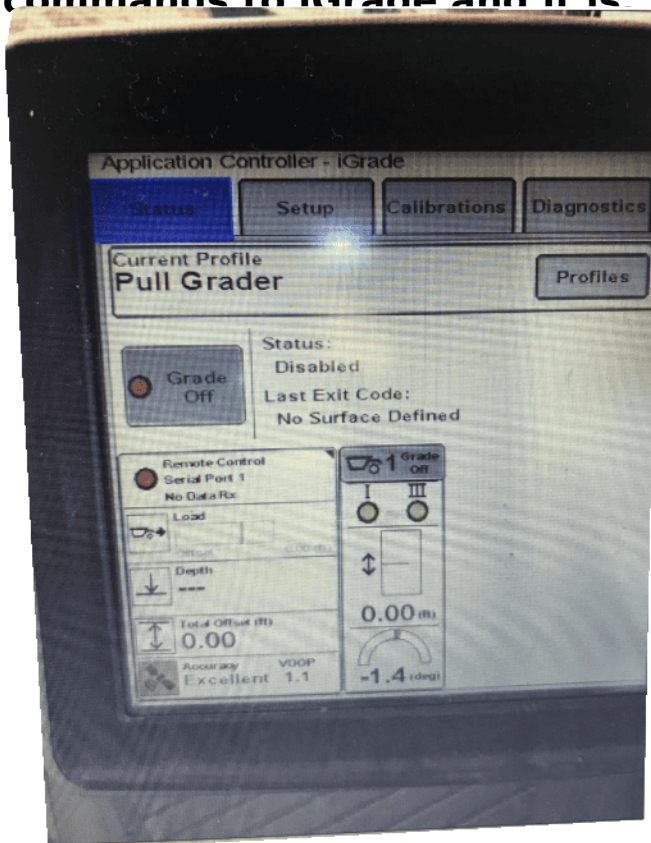
User cannot turn “Grade On” with iGrade 2.

Symptoms:

You have iGrade setup for remote Control. You have a field design in T3RRA Cutta with your zero set and you are on the design surface in the field. You select the “Grade Off” button to turn “Grade On” with no luck.

You have checked T3RRA Cutta to make sure you are sending commands to iGrade and it is

“Grade Off” button you will see the Exit Code: No Surface Defined”.



Cause:

iGrade is not receiving messages from T3RRA Cutta, therefore “No Surface Defined” will be displayed and iGrade will not let the user turn “Grade On”

Solution:

Check the serial connection from T3RRA Cutta to iGrade. Use the Diagnostics built into iGrade to ensure serial communications are being received. You should see the “Line Count” steadily counting up.

Check that the iGrade harness is not faulty, or has pins backed out

Poor as-applied coverage.

Symptoms:

The as-applied map looks blotchy, streaky, incomplete, or otherwise incorrect.

Cause:

- **The as-applied map will only be correct for a single machine working in a field. If part of the field is done by another machine this information will not be relayed to the current machine.**
- **Blade shift is altering the implementation of the design.**
- **Pixel size on screen is too large.**

Solutions:

1. **Ensure the machine and implement settings are correct to allow as-applied to work correctly.**
2. **Ensure your pixel size is no more than half the implement width you are using.**
 - a. **Pixel size can be adjusted in the “Projects” tab of settings.**
 - b. **It is recommended to select the option closest to $\frac{1}{3}$ of your implements width and no more than $\frac{1}{2}$ of its width.**
3. **Check your zero range setting. Some very low zero range settings can give undesirable results.**

4. **Ensure your blade shift is set to zero, the blade nudge will apply above or below the design updating the as-applied to show the work is not complete.**
 - a. **If blade shift is on in the T3RRA software it will be seen in the lower left of the screen.**
 - b. **If the shift value here is not zero press the up and down arrows until it is zero.**
 - c. **Do not use the blade shift function for shifts that are meant to be permanent. Alter the vertical offset value for this purpose (ie., re-zero)**