What's New in Version 2.00

Update Type

S0C2-0N2-0T1.stf contains the following upgrade details.
Controller Firmware V2.00
HMI Touchscreen 2.00 (User Interface)
This update includes all the patches applied to previous versions.
IMPORTANT: Automatic Changes and Settings…

1. The scale model type set to FX and standard grain configuration.
2. Scale warmup time set to 30 minutes.
3. Vibrating motor starting time set to 30 milliseconds.
4. The default profile changes
   - Bulk Stabilisation set to 100 milliseconds (this will help the AISL find a better setting).
   - Fine Stabilisation set to 100 milliseconds (this will help the AISL find a better setting).
   - Final Stabilisation set to 1200 milliseconds.
   - Pulse off time set to 300 milliseconds.
5. The old log files renamed to V3-error.csv (new log file created).
6. Powder Cup monitoring laser turned off.
7. Powder cup monitoring defaults has been changed to -0.20 and 0.00 this will prevent unknown overcharges should a few kernels fall into the cup when putting on the pan.

Purpose

Version 2.00 had been entirely driven by user experiences and feedback. This version represents a monumental step in the SuperTrickler's ongoing development.
The focus has been on stability over speed, with the introduction of several new technologies to help improve the dispensing process. The SuperTrickler has three separate Artificial Intelligence Engines (AIS, AIO & AISL), in this version all three have had a significant upgrade with an increased ability to cross communicate and work as a true team.
We attempt to avoid changing user setting where possible however this version has so many significant changes that the above Automatic Changes and Settings were unavoidable in order to accommodate all previous versions.

Future

The next version will again continue this work with our users to refine operational needs as we learn from our user experiences. The ability to export/import and share profiles remains high on the priority list, along with bullet weight sorting. We also hope to do more work on the laser cup monitoring system, but will remain experimental.

Install

1. With the SuperTrickler **powered on** and in any menu, remove the Micro SD card (tweezers are a great help).
2. Copy the S0C2-0N2-0T1.stf file on the root (top level) directory of the Micro SD card.
3. Reinsert the card back into the SuperTrickler.
4. The system should automatically take you to the Upgrade screen. (System – Setup - System Core – Firmware Update)
5. Press & Hold the Start button for several seconds until the process starts.

Changes are from the previous Version 1.05.4

New Technologies

- AIO (orchestrator) - **Inflight Tracking**; this system tracks the inflight amounts on every charge (drop), its purpose is to track trends as the level in the hopper changes the flow pressures into the trickler tubes.
- AIS (scale) – **Predictive Analytics**; this new technology (sorcery) significantly extents the ability of the AIS to create an image of the weight in between the reads from the scale data stream. This information is then made available to the AIO, for a more rapid responses and event decision making. The results from this technology have been remarkable and have significantly improved consistency with Bulk, Fine & Slow operations.
- AIS/AIO **Pulse Dithering**; the pulsing instrument has been an issue, however a necessary instrument to supply the final few kernels to the charge if necessary. In the previous version this process has been a simple static process (on for a fixed time, off for a fixed time and repeat). The problem is that this regular pulse would form a standing wave with some powders and at the point the powder will refuse to move along the vibrating tube. The pulse dithering system is a very complex volley between the AIO operating the pulse and the AIS reading the weight change. It's function continually changes the operational on, off times and speed (based around the profile settings) relative to the weight remaining and pulse counts to ensure a standing wave does not sustain itself in the tube.
- AISL (self-learning) – Has had a complete upgrade to utilise the information and work inline the features now available from the above new technologies.
- AISL – **Moderate Learning**; in previous version the AISL would take the extremes of errors with the philosophy that if it happened once, it will happen again. This is a sound philosophy however it always forced the self-learning into to worst case scenario. The internal artificial intelligence neurology would then attempt to limit this reiterative process from continually slowing the system down in a desperate attempt to stop overthrows. In several ways this process could start to work against itself with no way of knowing it was making things worse (it has a negative attitude). The Moderate Learning process now allows the self-learning to make more reasonable decision and although it may be a little slower to learn, the learnings are more practical in nature.

A Special Note About the Self-Learning (important please read)

As human beings we learn by experiences, as does the AISL, and just like in our early childhood, good or bad experiences will lead to very different adult life personality, beliefs and skills (this is called a Gestalt). So in the case of the AISL a bad experience at the wrong time, can set the self-learning on a poor path and as it was put to me by one of unofficial beta testers, it went off into never-never land. However a good experience at the right time and the results can be spectacular. So let me say this about the artificial intelligence now in version 2.0; forget your concepts and what you think you knew about the AI, and just let it do its thing. If after about 10 or 15 charges, if the results are bad, reset the profile and give it another go but if the result are good just let it go. When you recall a powser or preset, even if the self-learning is off don't react too quickly to an overthrow or even a few in a row as this is often just the AIO inflight tracking finding its footing.

Removed

- The AISL (Self-learning) no longer makes any changes to the Slow Instrument; this instrument by default is off and is now a totally manual instrument.
- Self-learn Aggressive has been dropped.
- Bulk motor purge – this was not required and could possibly leave the tube partially unwound.
- Bulk motor direction option in the motor flow test screen removed for the same reasons as above.

New

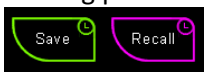
- Bulk Setpoint Offset; the bulk tube has had previously an in-build offset generated by the self-learning however with the introductions of the new technologies employed, the need for this offset has been eliminated as a requirement. The purpose of the offset was to stop the bulk instrument well in advance to allow the fine instrument to have a proper chance to operate in order to fill the remaining weight. Without it a regular situation would occur where the bulk would stop to close for the fine to operate but leaving a large gap for the pulse instrument to cover. The setting has now been removed from self-learning and exposed to the use setting in the profile. I did not want to remove it completely as is has been an essential parameter and may still have a usefulness with some powders.
- Instrument inflight weight as seen by the AIO is now display on the screen at the end of each charge (previously only the instruments used were displayed). This information can be incredibly useful to power users to make far more informed changes to inflight values.

- A Successive count has been added to the charge screen, this is a per-session count and will reset when an overthrow occurs. The display is updated at the end of a successful charge and at the start of the dispensing cycle.
- A Total Successes count has been added to the charge screen, this is a per-session count and will reset when the powder or pre-set is changed or if the adjacent reset button is held on a few seconds.
- The Bulk, Fine & Slow instruments will now show the Inflight Tracking information, in grey (this is the value that the AIO is operating with and not the Inflight value set).

- The inflight information has been added to the error log information.
- If the SD card system cannot recognise the card, you can now touch and hold anywhere on the screen and it will take you into the SD card screen with the Format button ready for you take action.
- If the cup monitoring laser is turned on then a small blue box will appear above the powder cup display.
- If the bulk tube is removed and the Change Bulk Tube exited before installing the tube the RED work light will flash until the Install Tube button is operated.
- The profile screen now has a ‘Copy’ & ‘Recall” (delay) buttons, that will ‘Copy’ the current profile (complete) into a profile clipboard and can be recalled at any time with ‘Recall’ button, recalling will overwrite the existing profile.

- The update screen has a new button to allow the operator to remove (move to the \bak folder) a stuck or unwanted STF upgrade file. This should not be a common issue.

Changes & Improvements

- The blue standby light comes on while editing the profile – this help a little with eye contrast.
- The profile tolerance settings are now on a separate screen however the settings can still be seen from the main profile screen.
- The profile screen now has the ability to set the ‘Vibrator Speed’.
- Fine ramp down is now shaped with an inverted S profile to ensure the Fine instrument leaves the tube with a more predictable loading in case the Pulsing instrument is required.
- Process information changes…
  The inflight details are recorded for the error log to help the support teams to evaluate better changes in the profile settings.
- The error log now includes information as to what the AI changed, to better help data analysis.
- Instrument Display has been changed to display the speed of each instrument and for the pulse the ‘on time’ is also displayed along with the speed.
- Pulse instrument operation display (target where the cup is displayed), in the previous implementation this display would simply toggle off and on with every the start of a pulse. This has been changed to only display

while the vibrator motor is tunning. This change gives better indication of how the AIO and AIS are operating the pulse instrument.

- Full version number including patch numbers added to most screen where the firmware version is displayed.
- The Self-learning process now includes the ability to measure and set the stabilisation time for the bulk and fine instruments.
- The Fine instrument ramp down profile has been removed from the Self-learning and is now a manual setting.
- System **Vibrator Start Speed** Menu item has been changed to **Deep System Settings**, this screen has now made general purpose.
- Ability to completely disable the laser has been added to the **Deep System Settings** screen, if you disable the laser the system will no longer read or test the laser and the Peripheral Menu button will be disabled to prevent access into the laser screen when disabled.
- Once option button has been added to the Automatic Power Up times screen, this allows the operator to set up a one-time only automatic power up event.
- STF upgrade files are no longer deleted, rather they are now moved to the \bak folder on the SD card.
- On the charge screen when in Automatic Mode and the start button is required to commence or recommence the process, the Start button will now flash. There are several reasons that may cause this condition to occur.
- The instrument motor running display is now animated with one of several animations. 
- Ladder operational text changed from “Charge #, Round #” to “Step #, Round #”
- Time Clock Drift adjustment added, it adjusts for drift per day in milliseconds (See manual).
- If a scale error occurs from the charge screen, a remove cup message will be displayed while the error is being corrected. 

Bug Fixes

- When the Log Powder Every Line option was on, the error log was off by one column issue has been resolved.
- Under some circumstances when the system was dispensing in Automatic mode if a scale error would occur, the process could start without the powder cup in place, spilling powder has now been resolved.
- The Automatic Power Up Times – times were being corrupted (this could also impact the Powder Data Cup Monitoring data) has been resolved.

Technical System Changes

- Rewind after bulk drop system code removed. Never used and no advantage.
- Serial number self-recovery made significantly more robust and is now CRC16 checked.
- Rotating motor start call, changed to be in line with the vibrating motor.
- Rotating motor chip to chip communications change from 19200 to 9600 baud. There was no advantage in the higher speed and there was a suspicion that not all communications we being reliably passed.
- Improvements made to the upgrade system to help in the future, to reduce the impact of an upgrade on user settings.
- The AIS now has an optional variable procedure call anytime new data has been received from the scale. The AIO now uses this to allow the AIS to efficiently take command of the operational aspects when required.
- Profile changes – as part of the pulse dithering process a new field has been added to the profile; pulse_cautious_off_time, this has been set at 1000ms and not available for users to change at this stage.
- Rotating motor self-test, now initially operates in reverse at 50% speed and then forward at 100% for a longer time, to ensure the tube is not left partially unwound.