

Weekly Update – Stave QA

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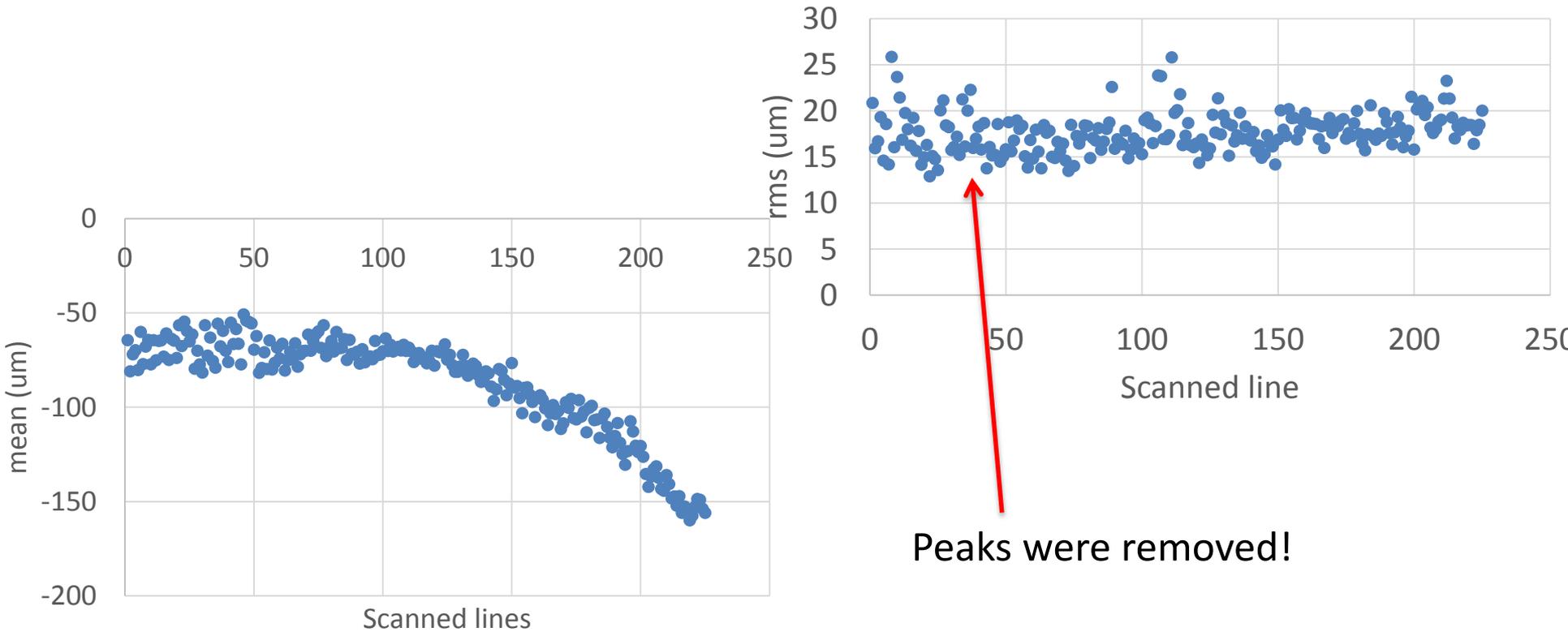
Oct 12 - 2016

Faster scanning

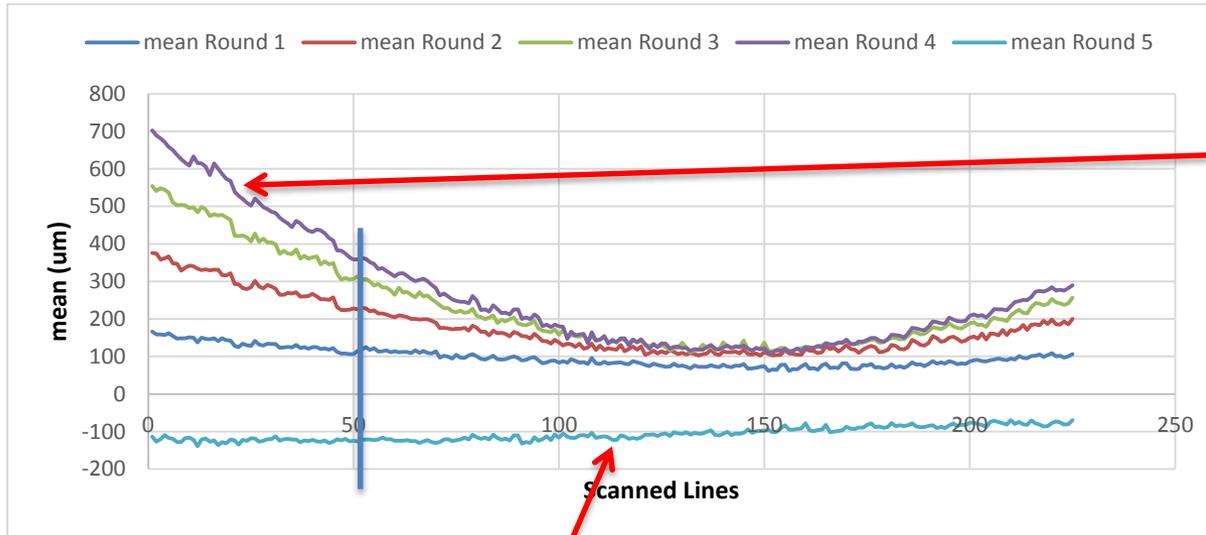
- I changed the speed of the linear stage, right now 225 mm are scanned in 4 minutes.
- The cart is returned to its original position in 3 minutes and a half.

Main problem

- The mean of the residual seems to increase in time, but the rms stays constant.



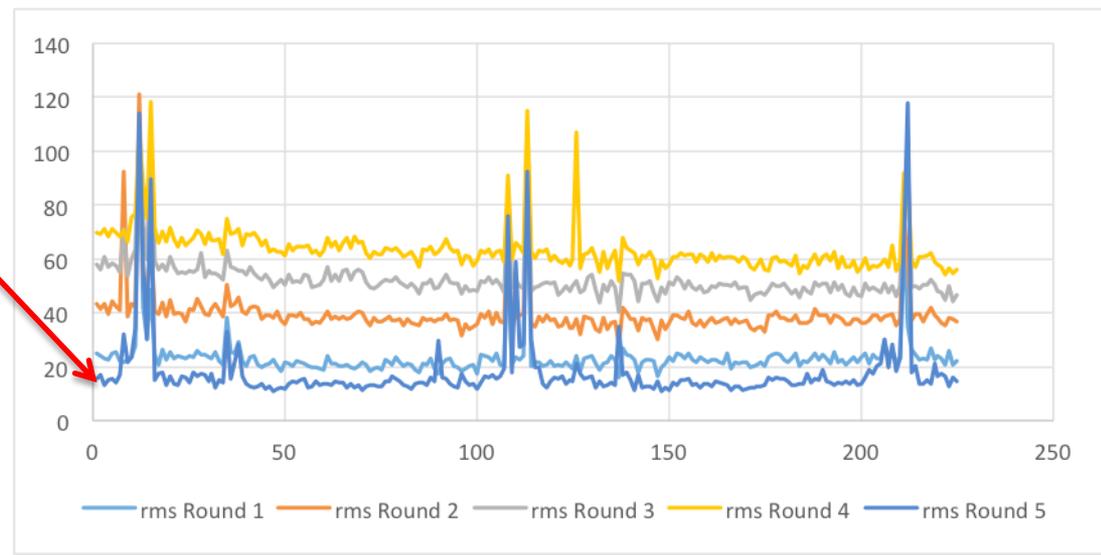
Scanning 5 times in a row



The difference went to the roof and keeps increasing.

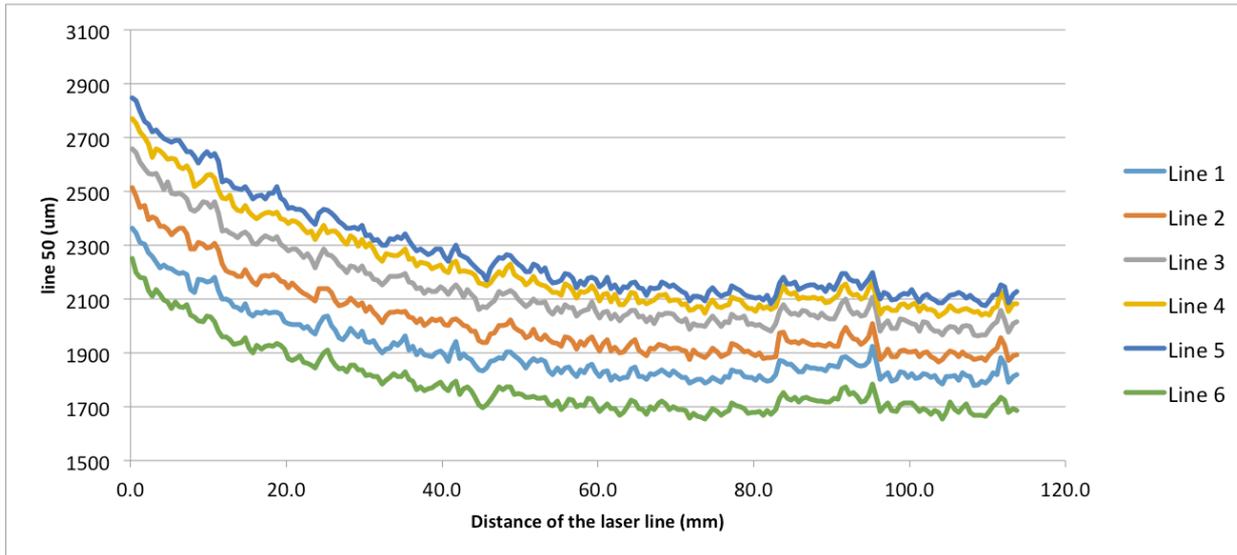
This data was taken about two hours after the other five.

Seems like something is left after each measurement.



Line 50

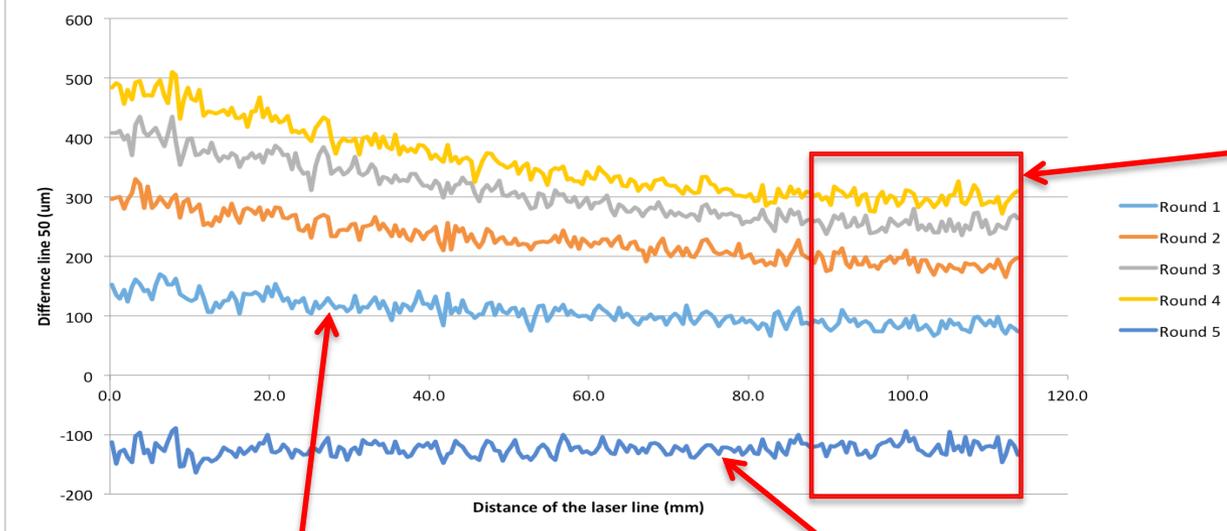
Line Profile



Look at a random line to see how the lines look like. I chose line 50 as shown in the last slide.

They all look like they have very similar behavior, but they are always getting worse. I calculate the difference

Difference



Seems like the rms is mostly affected by the shift in the mean, so I calculated the rms in the [90-110] mm range.

Average rms (5 rounds):

All pixels: **36.27 um**

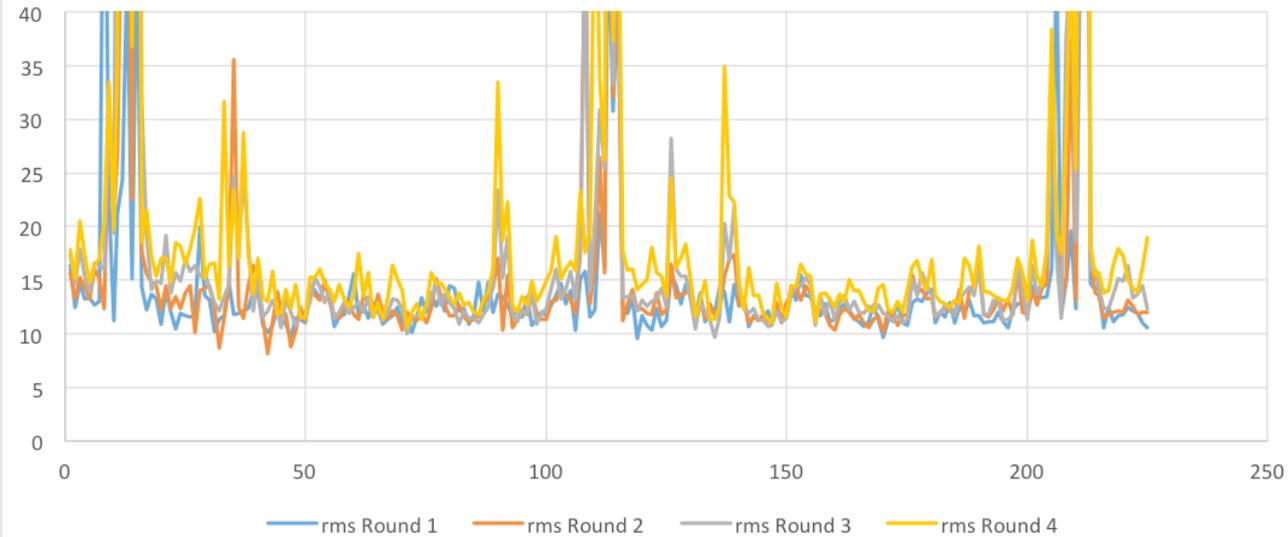
90-110 mm: **10.88 um**

rms = 21.67 um

rms = 11.83 um

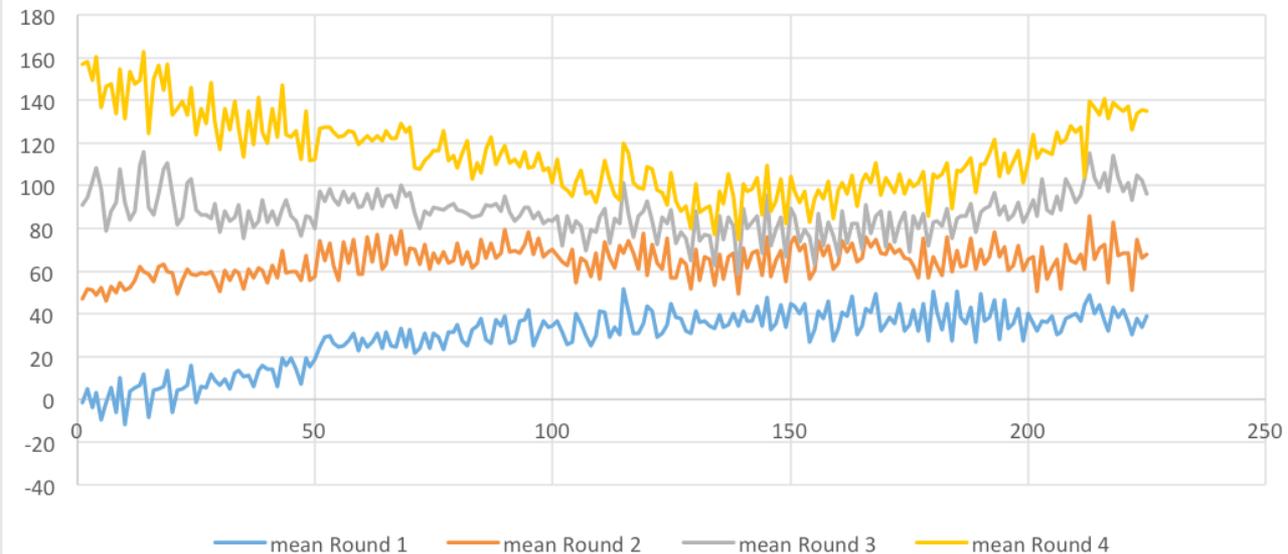
Then, turn off LABView after each measurement

residual rms



Seems like there is a systematic error in the program, so I turned off LABView after each measurement and plot the same variables.

residual mean



rms are constant again, and below 20 μm .

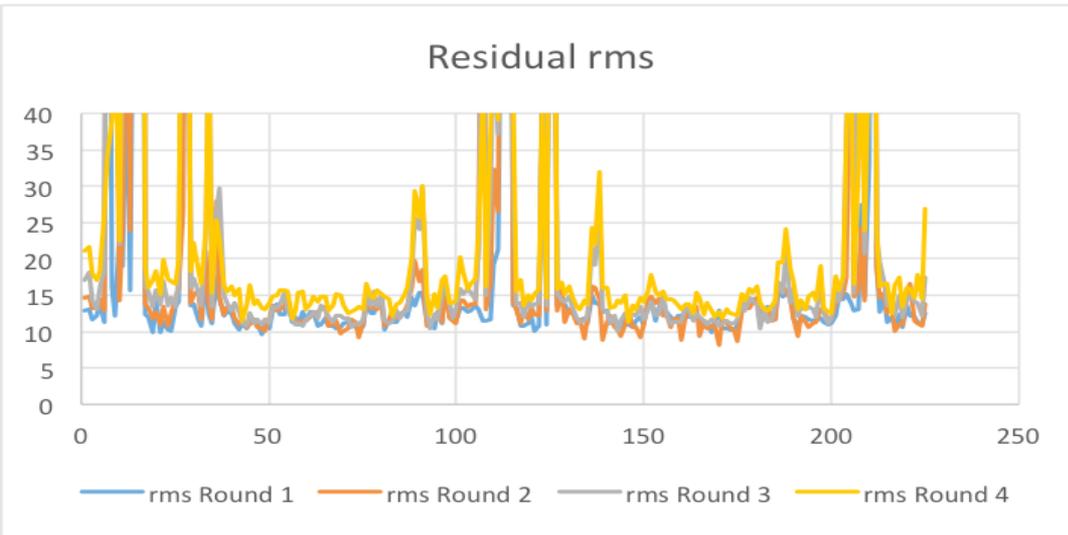
All the means are below 160 μm (much better than before) but still seems to increase after measurement. Not sure why, especially because all are **positive** again.

Actually...

While running these experiments, the code shuts down after a warning of 'lack of memory.'

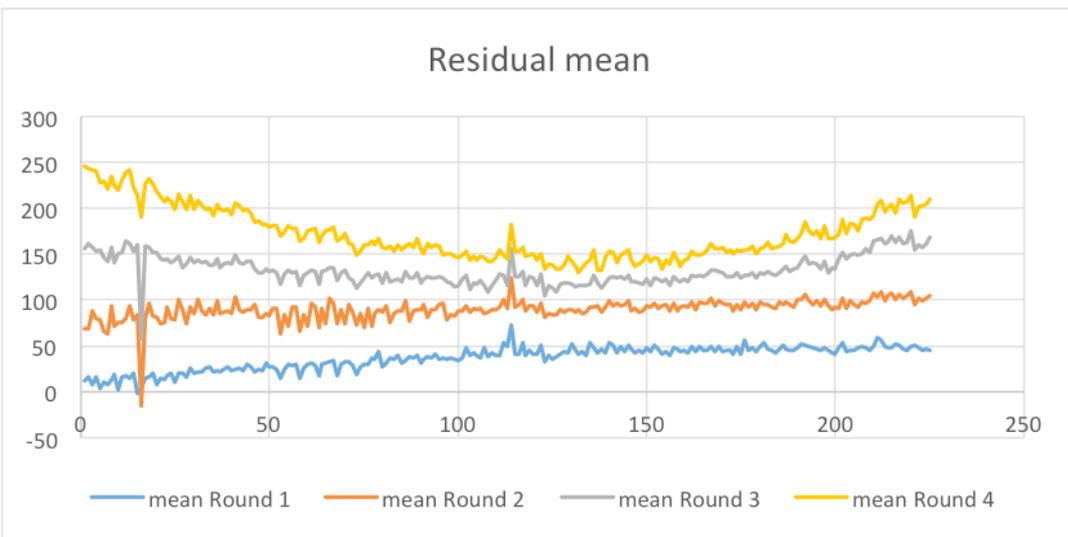
It seems I am using many variables, and the best way to not use most of the memory is to create subroutines (subVI) in the code.

After creating some subroutines



Now we can see that the rms is constant and below 20 μm (Good!).

The mean plot is not as large as before ($\sim 800 \mu\text{m}$), but we still see the steps after each measurement, and they are always positive.



I created more subroutines and the residual mean plot went smaller (not shown but under $\sim 160 \mu\text{m}$), but similar behavior.

I'm sure I'm doing something wrong, but still don't know where!