

# Weekly Update – Stave QA

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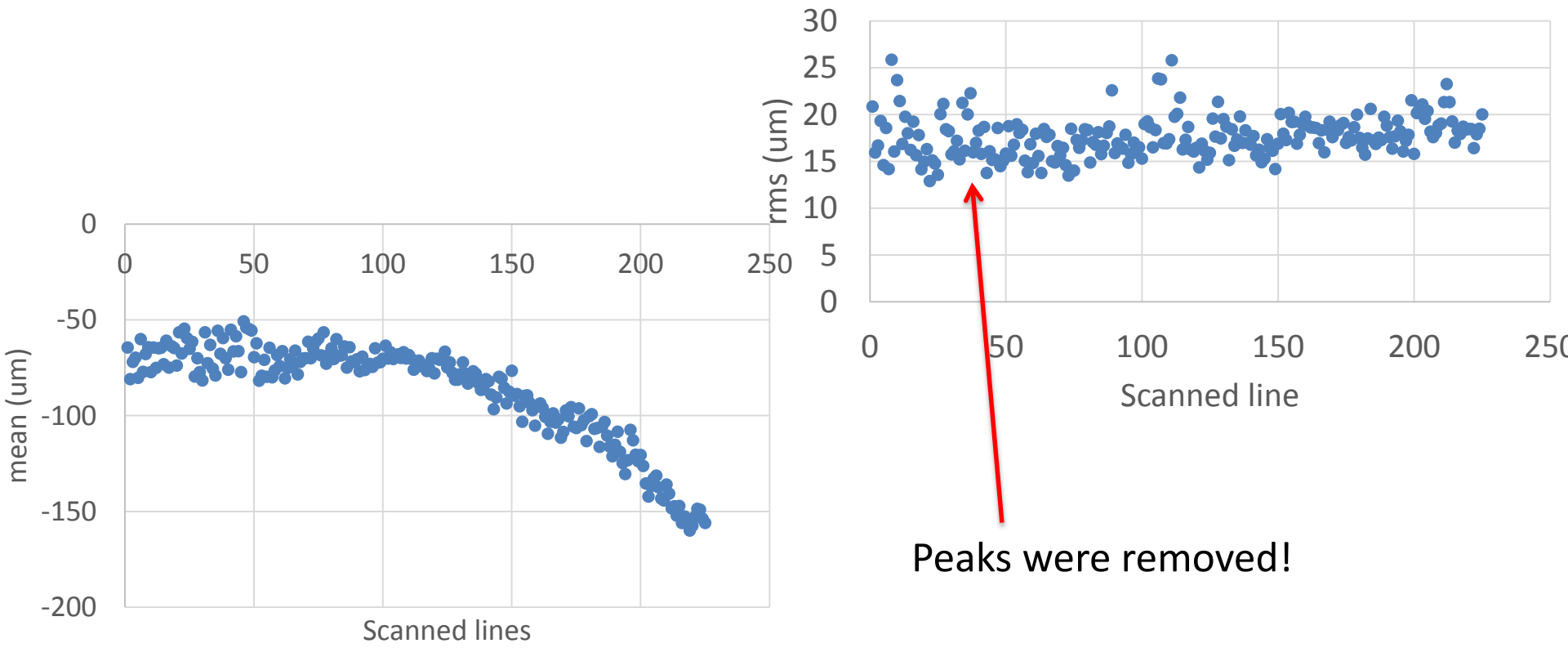
Oct 12 - 2016

# Faster scanning

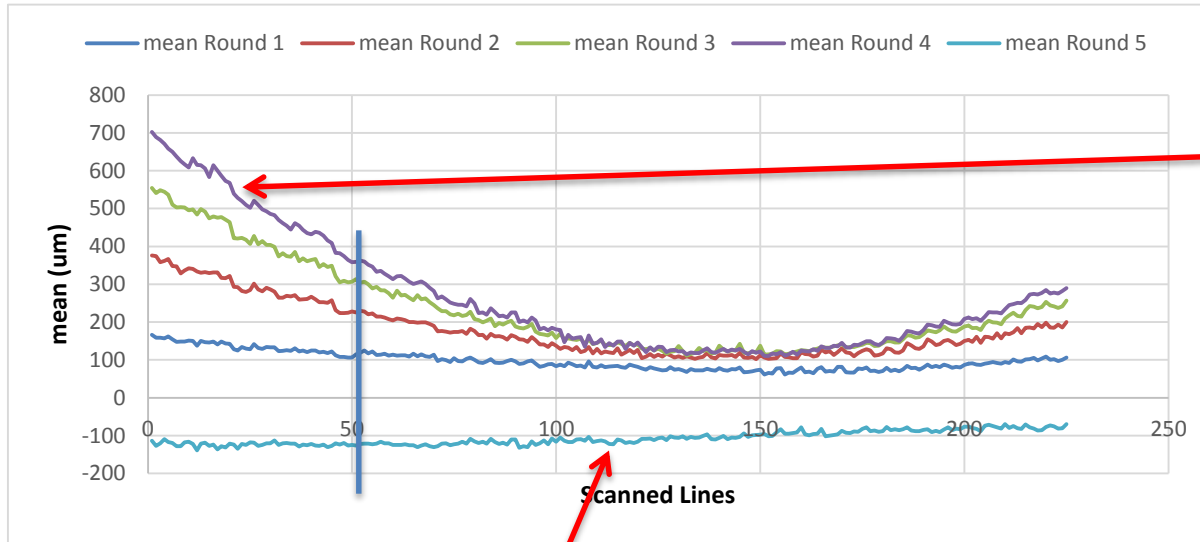
- I changed the speed of the linear stage, right now 225 mm are scanned in 4 minutes.
- The cart is returned to its original position in 3 minutes and a half.

# Main problem

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



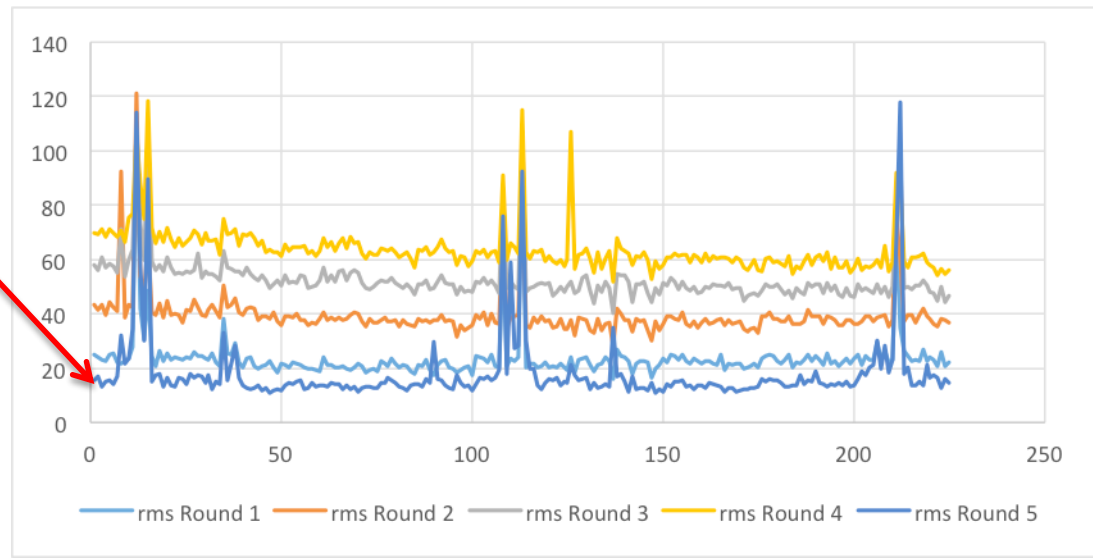
# Scanning 5 times in a row



The difference went to the roof and keeps increasing.

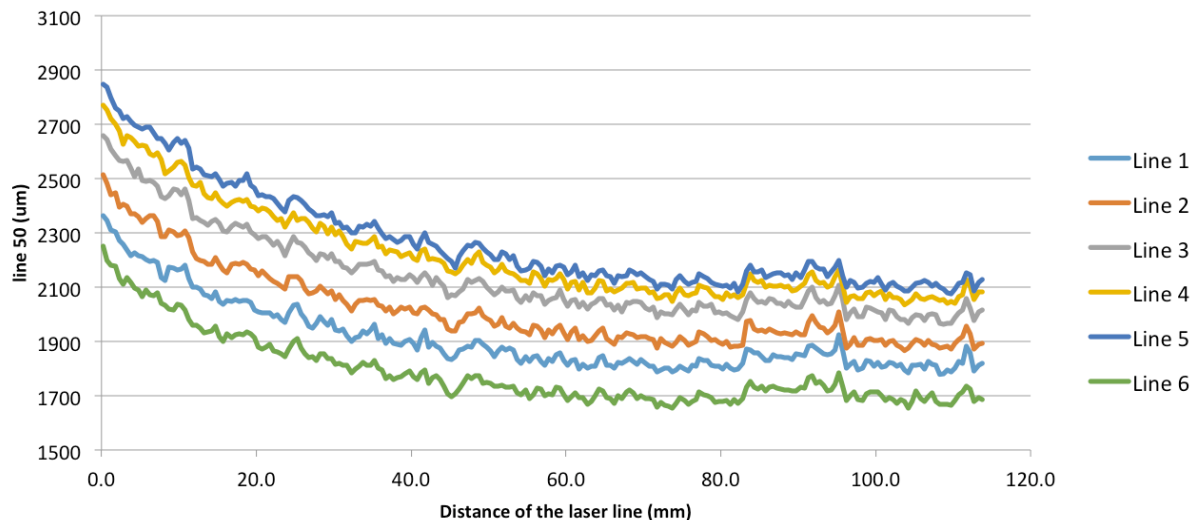
This data was taken about two hours after the other five.

Seems like something is left after each measurement.



# Line 50

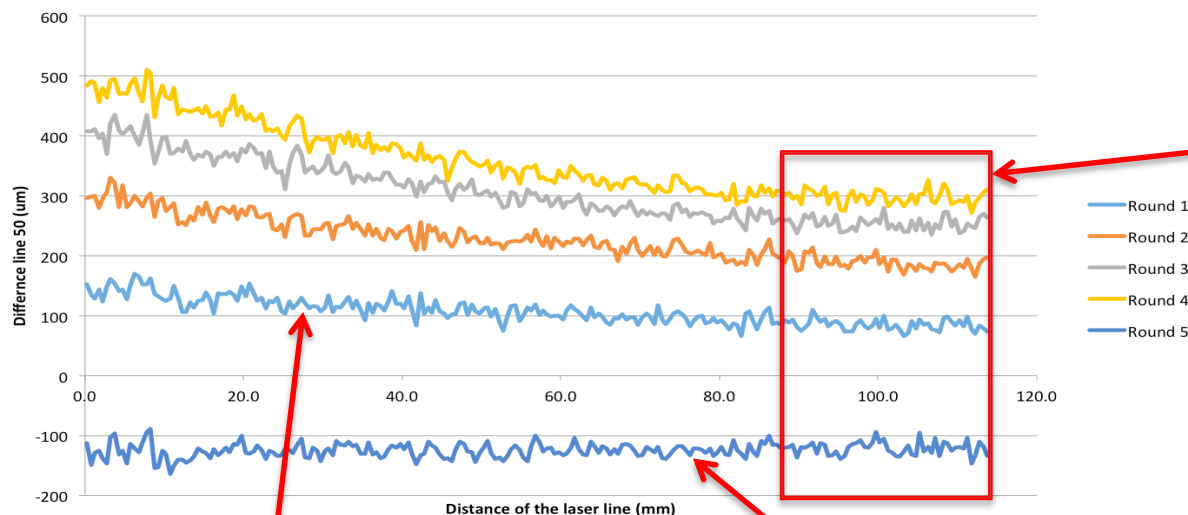
Line Profile



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

They all look like they have very similar behavior, but there 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**

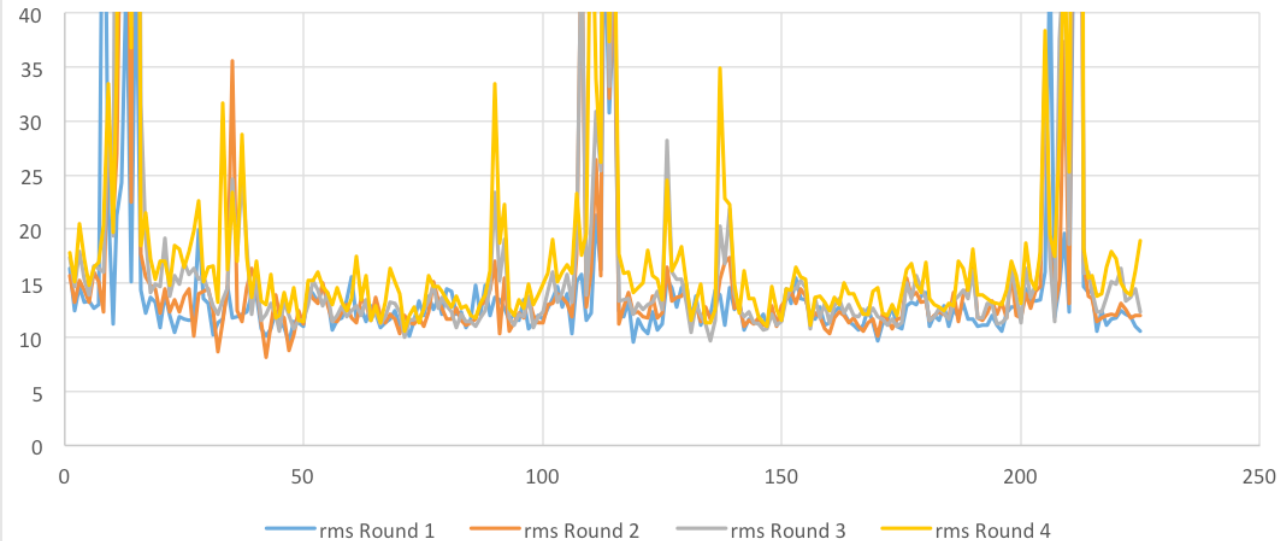
90-110 mm: **10.88 um**

rms = 21.67 um

rms = 11.83 um

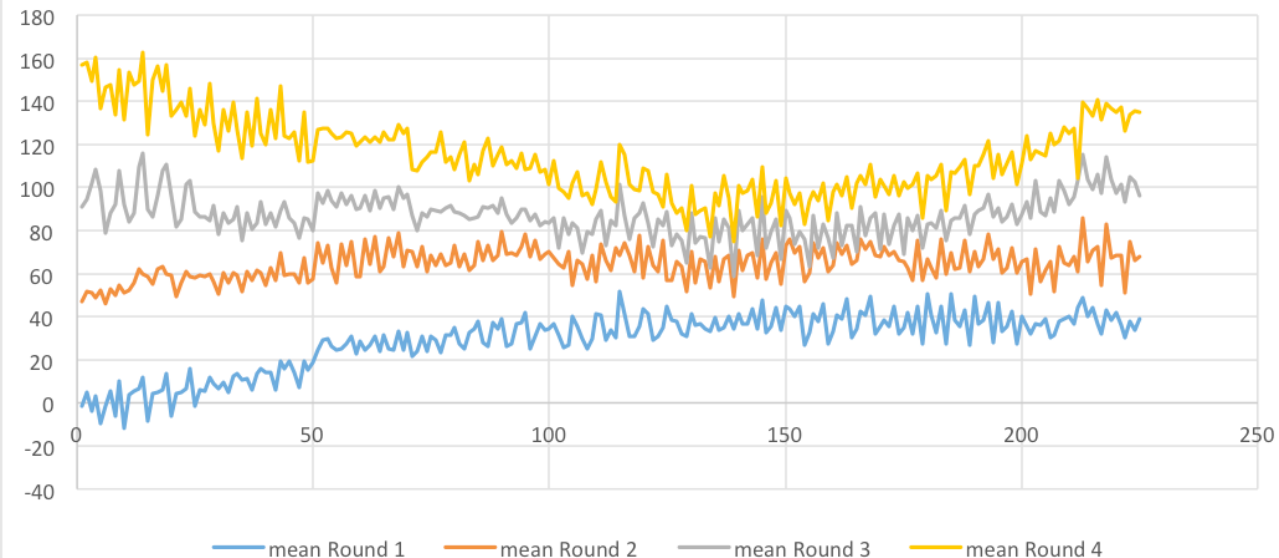
# Then, turn off LABView after each measurement

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  $\mu\text{m}$ .

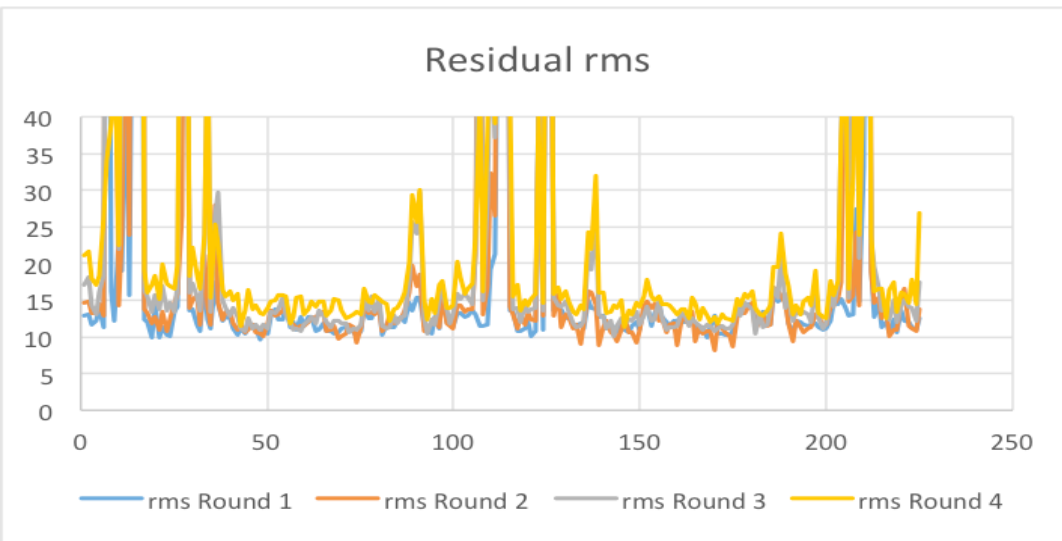
All the means are below 160  $\mu\text{m}$  (much better than before) but still seems to increase after measurement. Not sure why, especially because all are **positive** again.

# Actually...

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

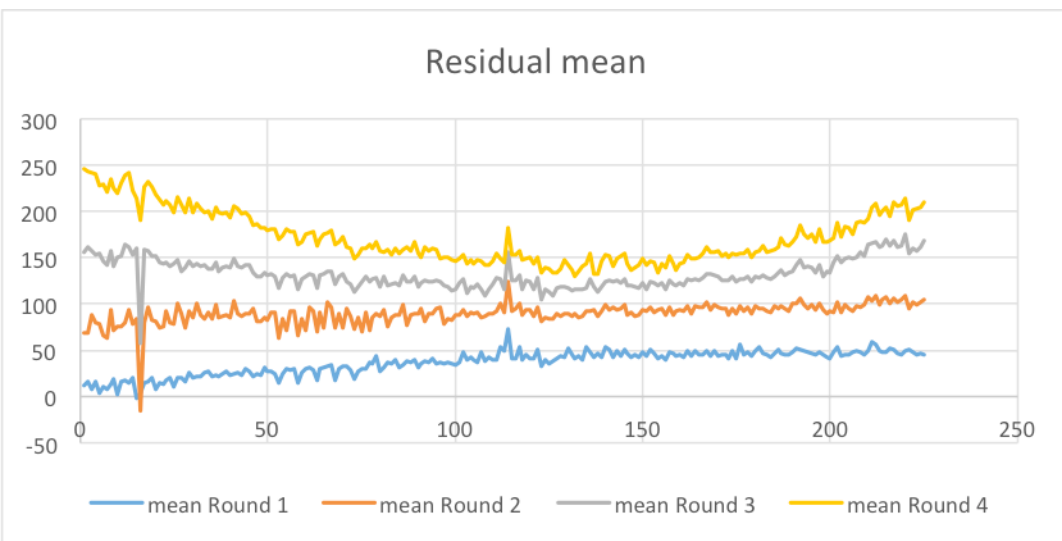
It seems I am using many variables, and the best way to not use most of the memory is to create subroutines (subVI) in the code.

# After creating some subroutines



Now we can see that the rms is constant and below 20  $\mu\text{m}$  (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!**