Straw Endpiece Centering and Straw Relaxation Test

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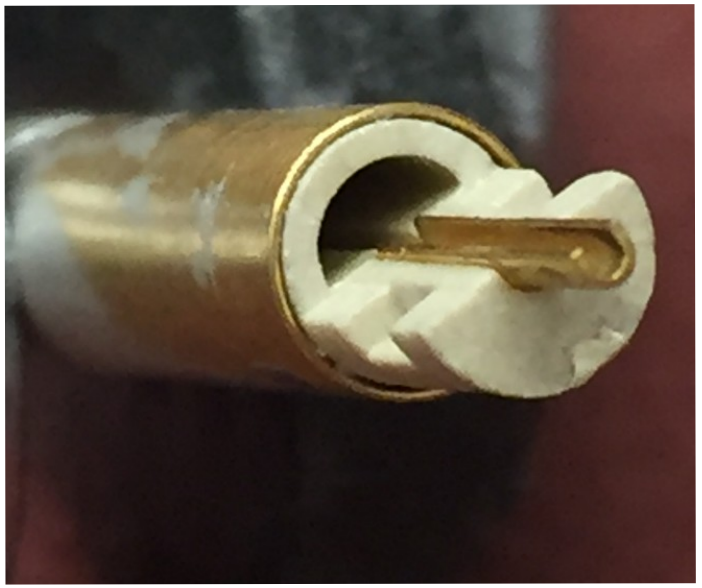
How centered is endpiece in straw?

- 25 μm diameter gold-tungsten wire is strung through straw endpiece
- Need geometry of endpiece so wire soldering procedure can be made

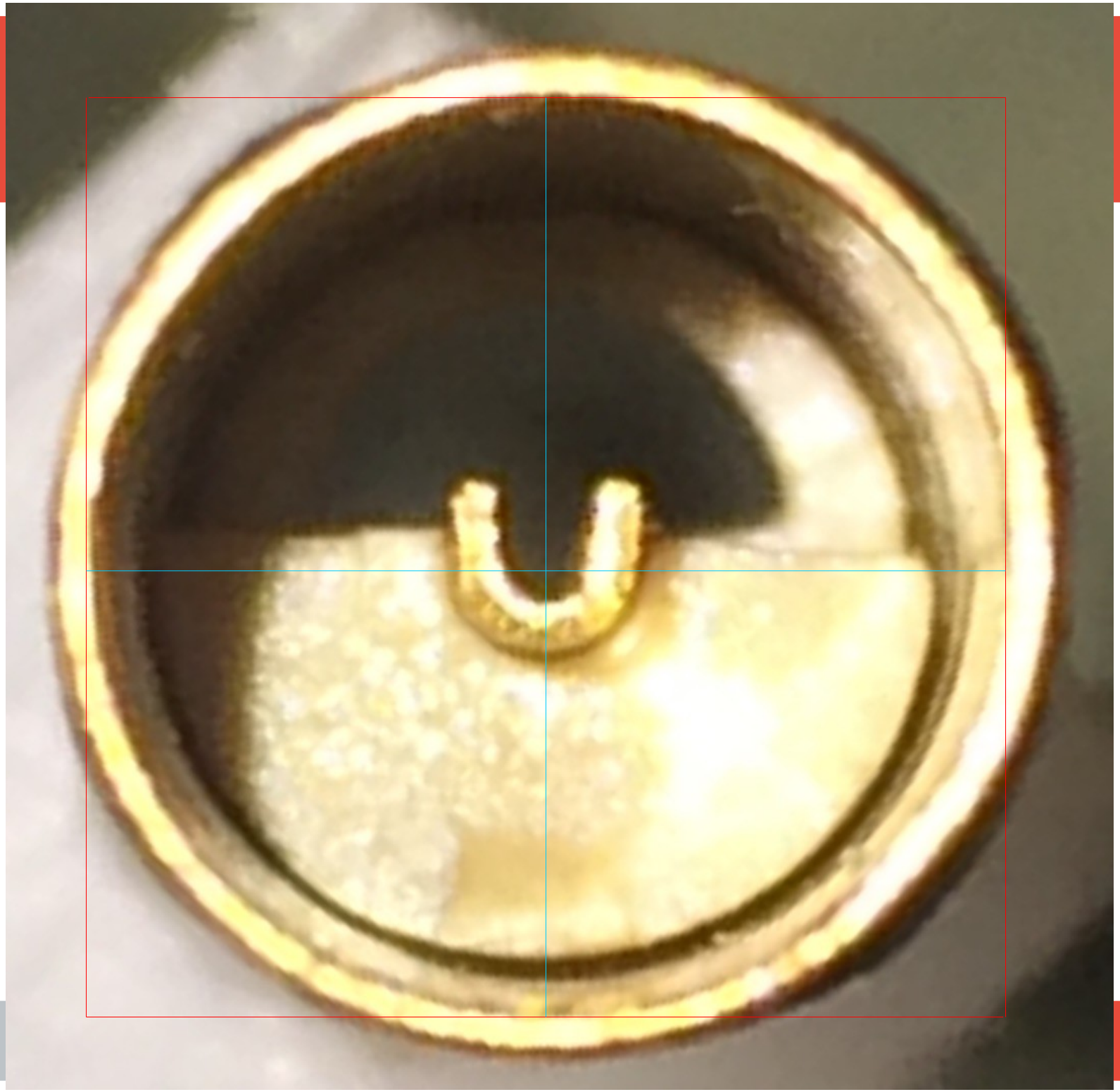
    -Wire must be within 100 μm of straw center

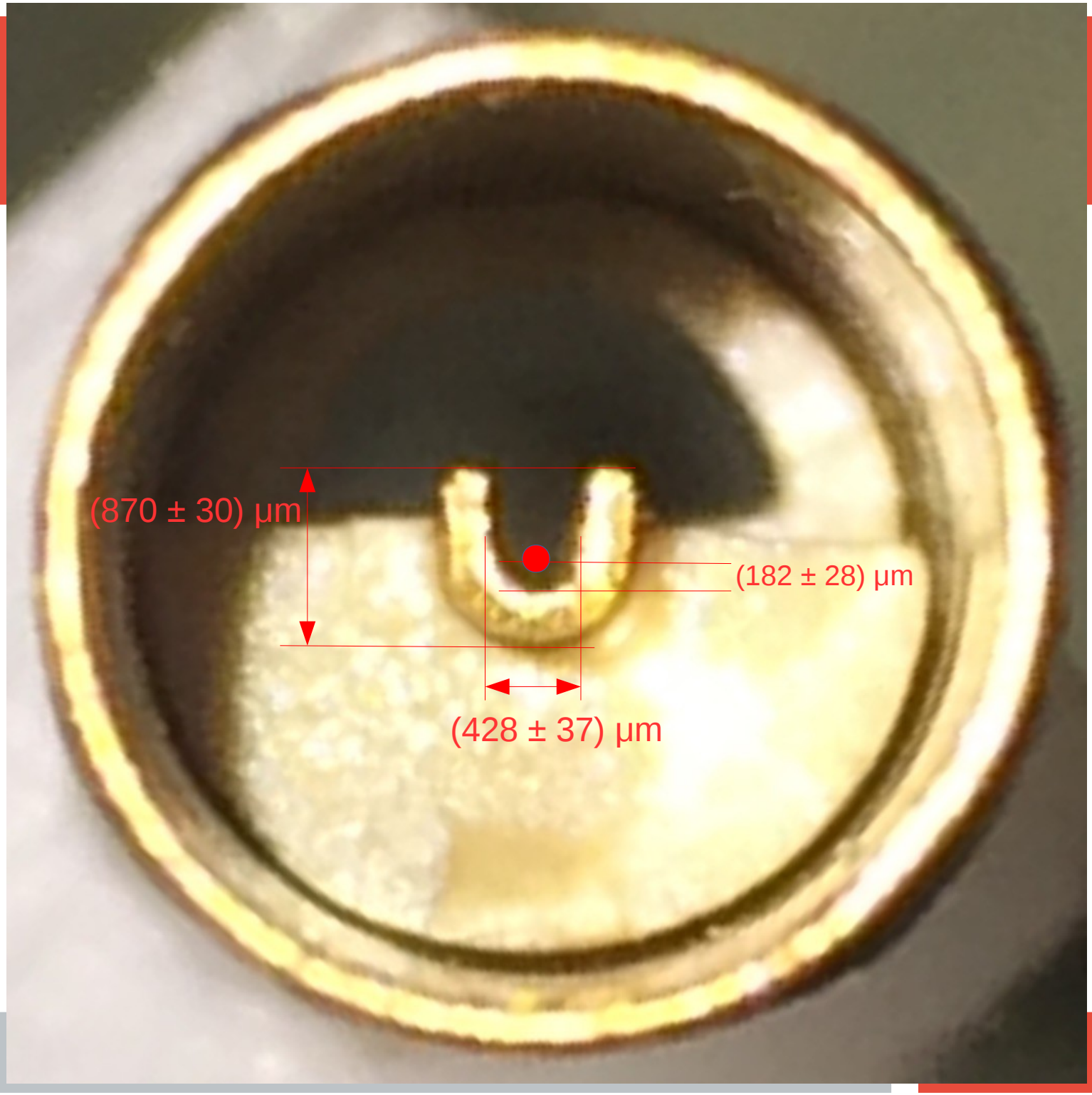
- Must find center in relation to “U” shaped channel



Making Measurements

- Endpiece is slid into straw
- Cylindrical brass sleeve placed in front of endpiece in straw for measurement
    - Ensures straw takes circular shape during measurement
    - Roundness is realistic; straws will be inflated
    - 30 micron clearance between straw and brass piece
- iPhone photo taken, analyzed with pixel counting software




(870 ± 30) µm
(182 ± 28) µm
(428 ± 37) µm

Improving Endpiece Measurements

- Future measurements should be done without brass piece
    - Added uncertainty from clearance
    - Maybe epoxy endpieces in place
- Use AmScope microscope with digital camera
    - Ordering 10 μm graduated calibration slide
        - Previous calibration was crude
    - Measure several endpieces more easily; look at distribution

Measuring Straw Relaxation Time

- Straws elongate after tensioning; must find out time until full contraction
- 3 sets of 4 straws will be tensioned at 800g force for 1/2/3 days, respectively
- Ends cut off, straws immediately cut in half, placed on measuring board and position is marked
- Board will go in closet in PAN 464 with door shut
- Length of straws marked each day on board until convergence

Potential Concerns

- One group of nails has 4.7 mm spacing – straws are 5.0 mm wide
    - 0.3mm compression at 4 points on straw shouldn’t interfere with relaxation much
    - Benefit: straws are in very straight line
- Other group of nails has 6.0 mm spacing
    - Problem: straws may lie in curved path, so measured length is shorter than true length

Curving Straw Calculations

- Assume straws are a 25” line and there is 1.0mm clearance between nails.
- What if straw follows a circular arc?

The arc length is 1 μm larger than the measured length of 25”

What if straw follows a sine wave?

If you measure 25”, straw is really 38µm longer