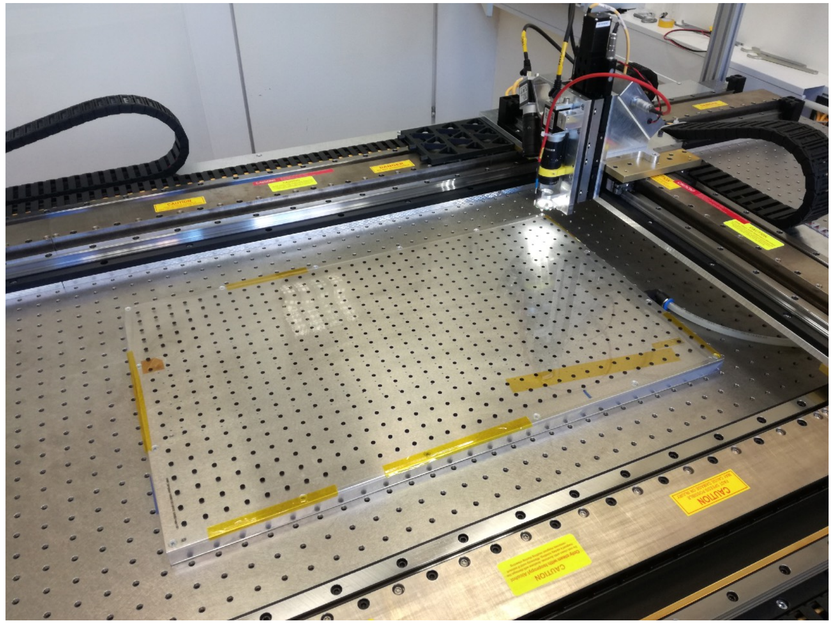
BTTR robot update

F9 SIC LAB WEEKLY

JSI - DESY robot cross-calibration

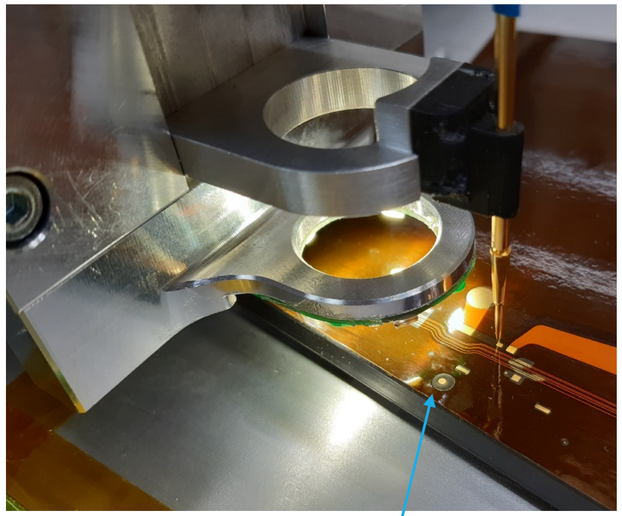
- Main factor is the dotted foil calibration. Foil with known spacing between points is used to calibrate any bending etc. of the robot stages.
- This calibration needs to be done only once (or if the robot stages are reassembled).
- Co-cured (Skin) tapes are used to measure differences between the robots.



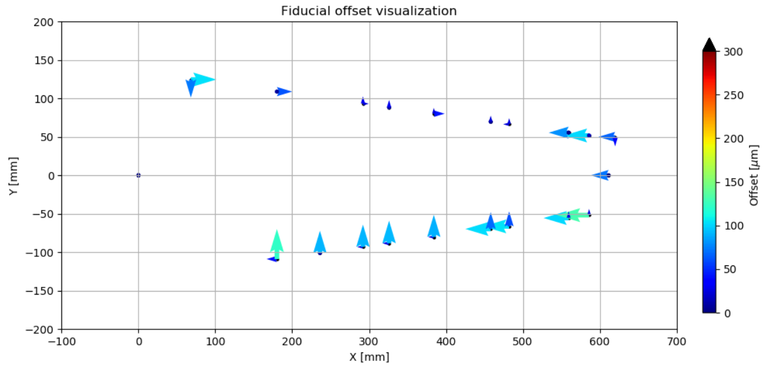
- Measurements compared:
  - DESY: ➡Smartscope corrected DESY cal. foil
  - JSI: ➡JSI cal. foil assuming equidistant points
    ➡Smartscope corrected JSI cal. foil
    ➡Smartscope corrected DESY cal. foil

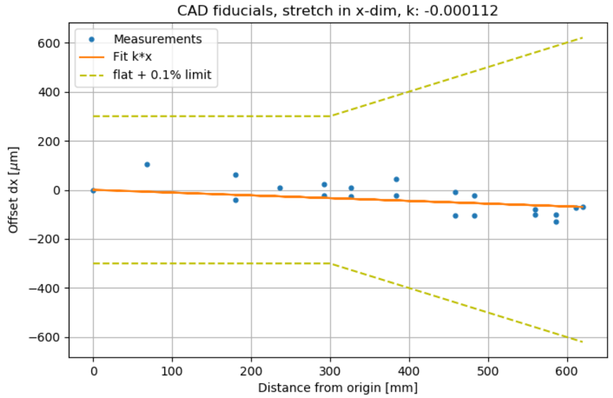
Tape stretch measurement

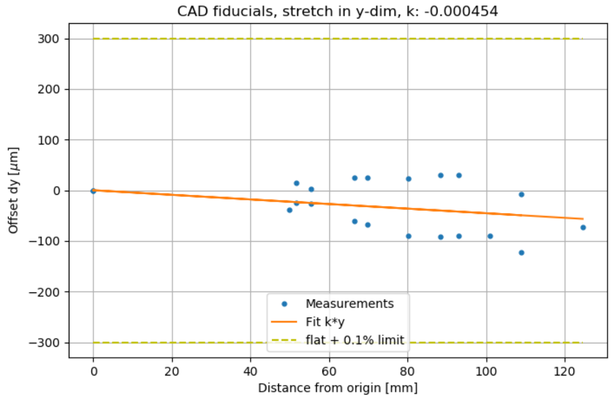
- Measure global fiducials with vertical camera mounted on Stage1.
- Compare measured positions with nominal.
- Linear **stretch coefficient** for stretch in X and stretch in Y direction.



Global fiducial

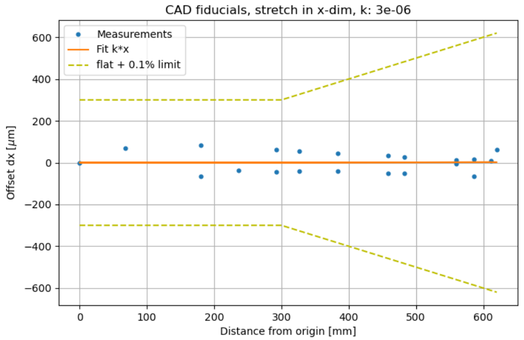


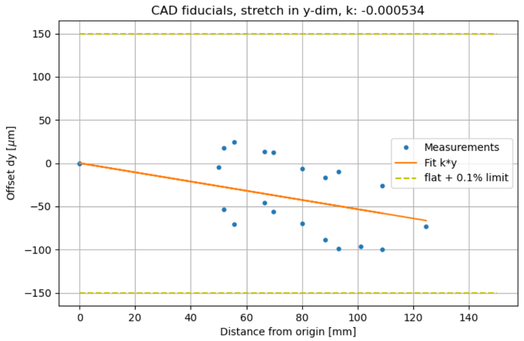




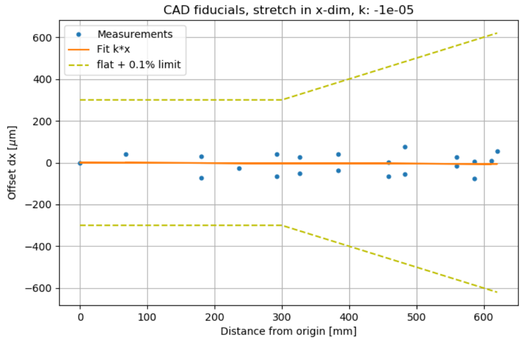
Example: tape 20USEBT2000011

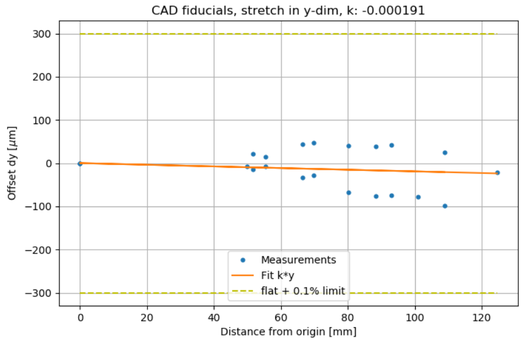
DESY, smartscope calibrated:



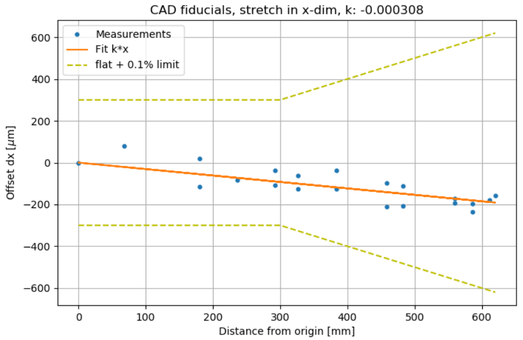


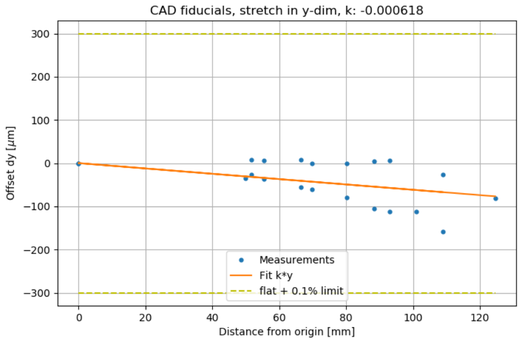
JSI, smartscope DESY cal. foil:



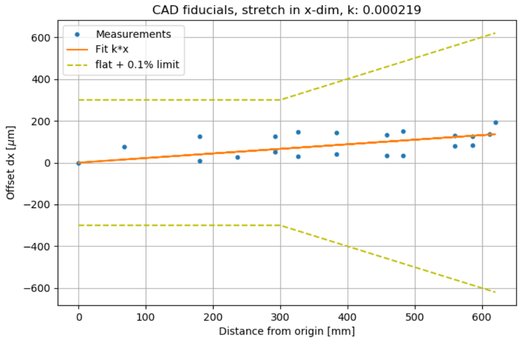


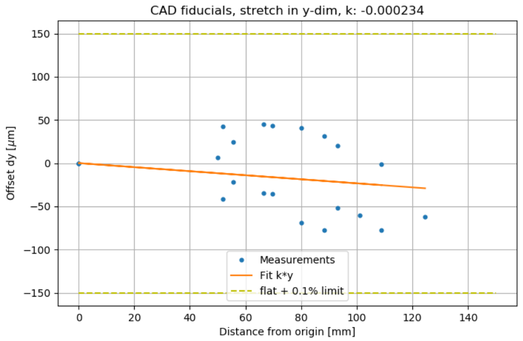
JSI, smartscope JSI cal. foil:





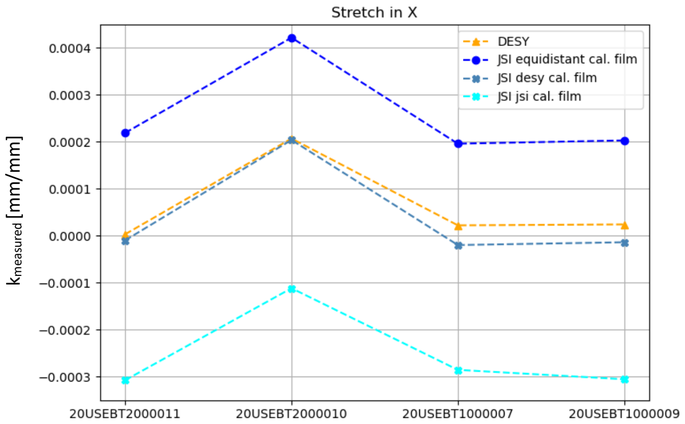
JSI, JSI equidistant foil:

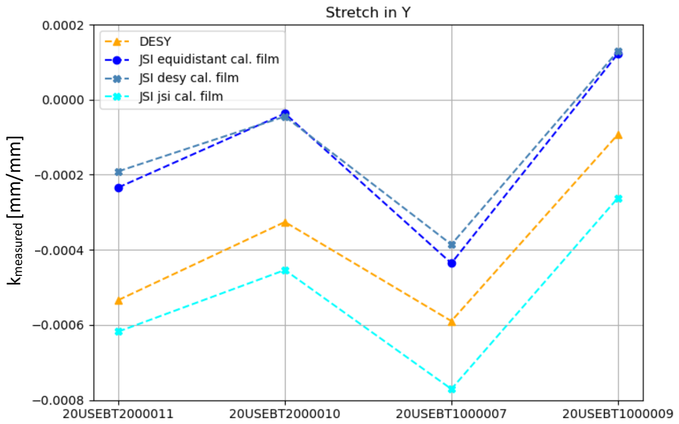




Four co-cured tapes

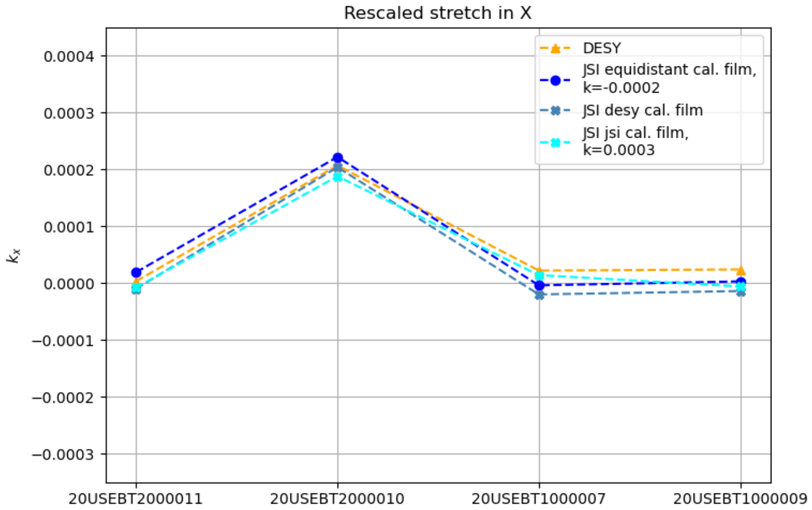
- Each calibration has a constant difference between stretch coefficients for all measured tapes.

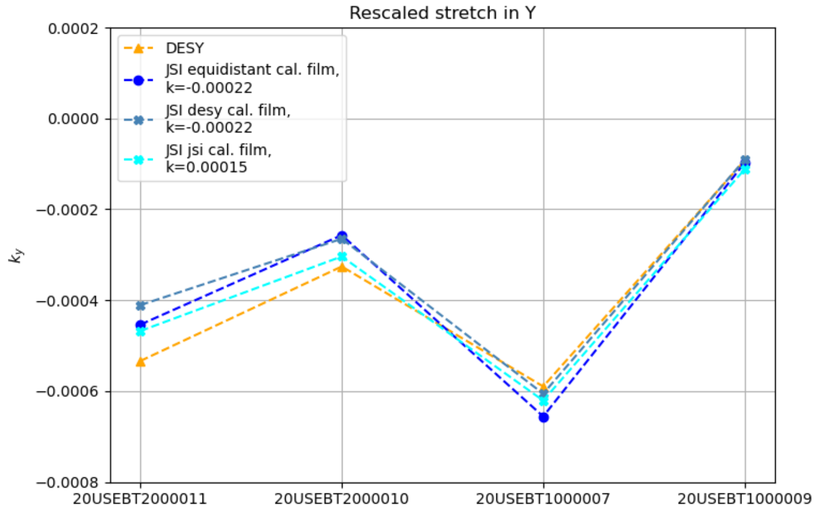




- Excellent match after adding a correction coefficient for each calibration. With this we rescale our measurements to the smartscope.

$$k_x=(k_{measured}+k_{(correction)})$$





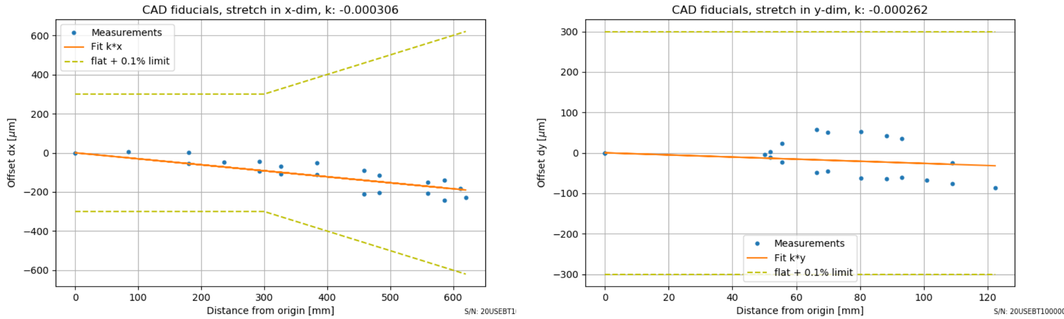
Correction coefficient

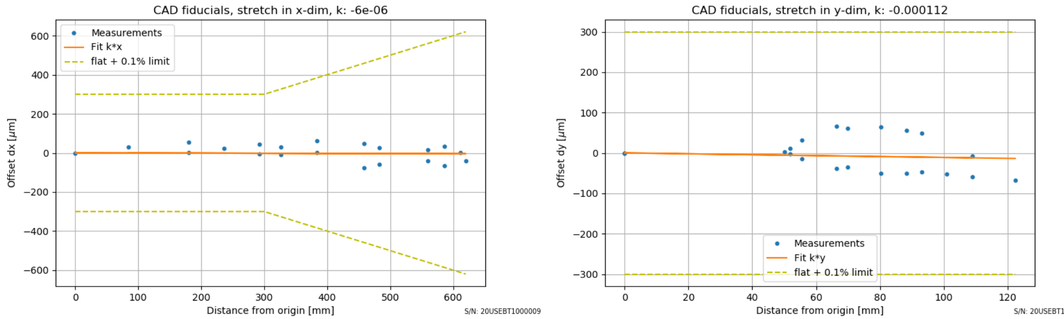
- Corrections added to the analysis procedure. They are recorded in the report:

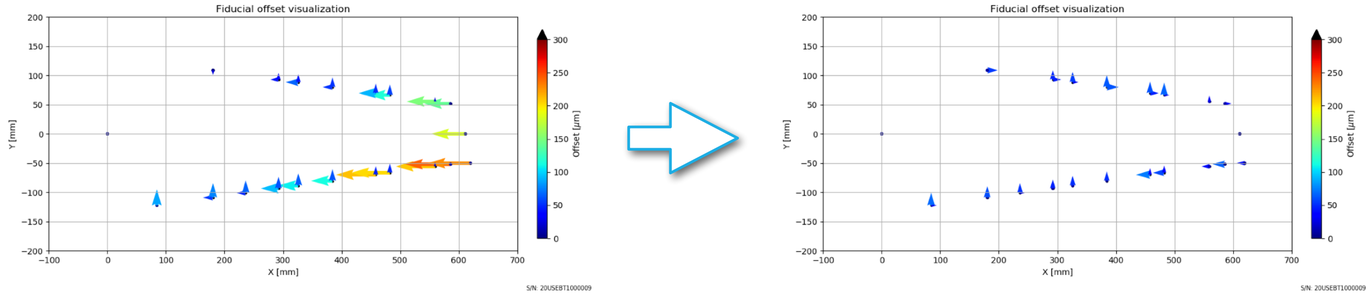
Production Stage = Skin

Analysis	Status
Stretch in X	PASS
Stretch in Y	PASS
Shorts check	PASS
Resistance measurements	PASS
1000V HV	PASS

Offset based on CAD fiducial distance from origin was used as stretch criteria.
Correction coefficient for rescaling X-axis: 0.3 µ/mm.
Correction coefficient for rescaling Y-axis: 0.15 µ/mm.

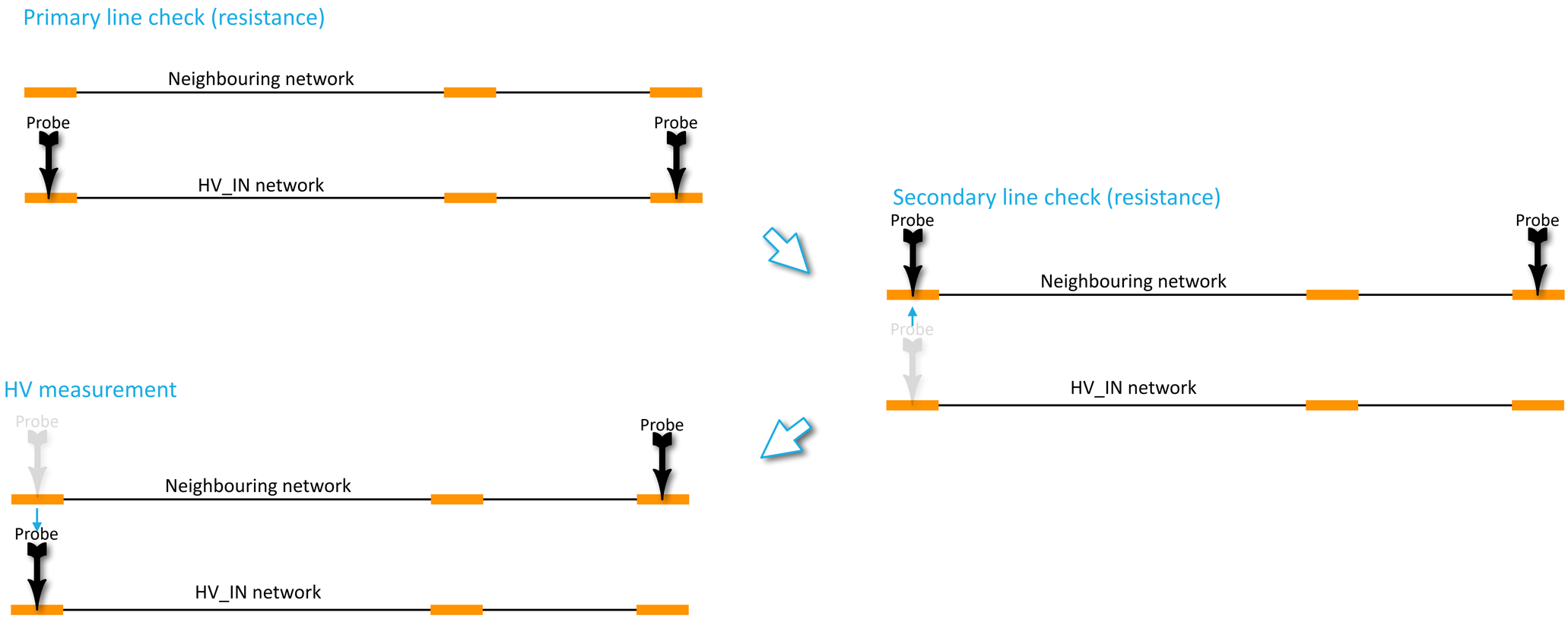






HV line checks implementation

- Before HV leakage measurement, probe contacts with both pads are checked.
- Requires two additional resistance measurements (few seconds each), but is the only way to make sure we correctly probe.



Final configuration files for bare & co-cured tapes

- **Bare tapes:**
  - 86 checks for short circuits
  - 23 HV leakage tests
  - 138/140 resistance measurements

  Test time:
  1 hour = 10 min loading & fiducial measurements + 50 min electrical tests

- **Co-cured (Skin) tapes:**
  - 86 checks for short circuits
  - 39 HV leakage tests
  - 138/140 resistance measurements

  Test time:
  1 hour 15 minutes = 10 min loading & fiducial measurements + 1 hour 5 minutes electrical tests