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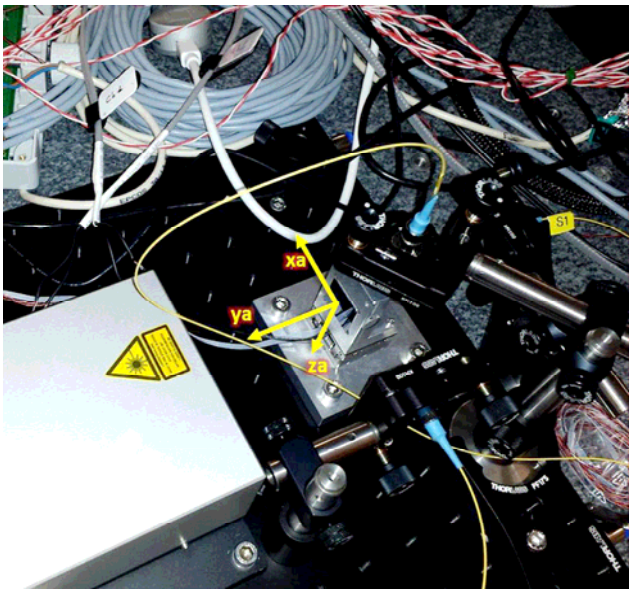
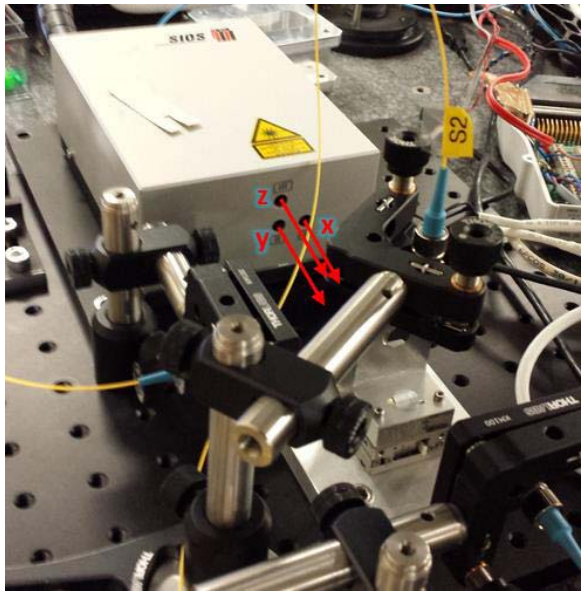
Cross check of the precision of the LPS-30 togethere with the Nanoscopium team /Synchrotron SOLEIL, France, march 2015

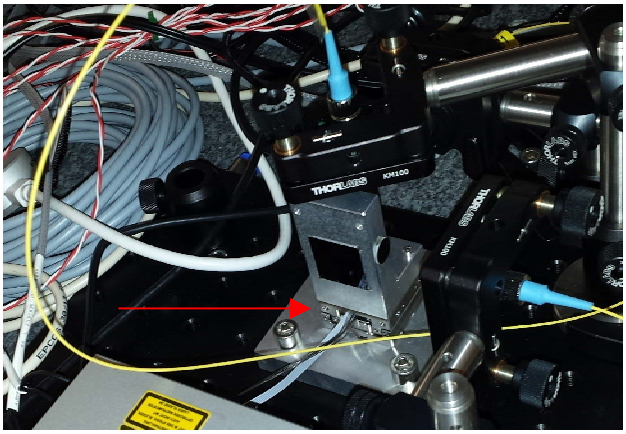
The data found at this location show the results from the LPS-30-30-1-1O-G-S-N from NANOS-Instruments evaluation done by using interferometry. All interferometry measurements were done using a double-mirror (measuring the axial displacements of the positioner) setup with the SIOS SP2000TR triple-beam on one side and Attocube FPS-3010 on the other side parallel at the same time.



Pic 1) yellow fibers are from the FPS-3010 (Attocube)



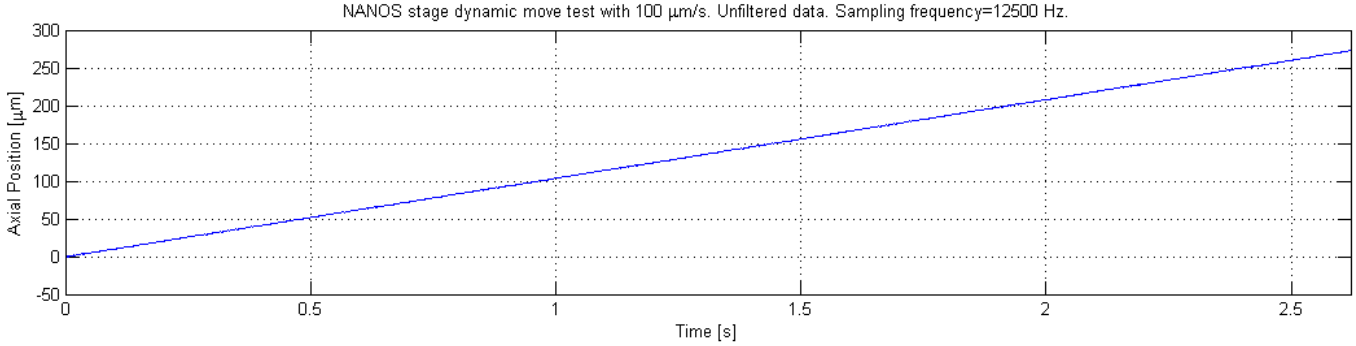
Pic 2) shows the SP 2000 TR (SIOS)



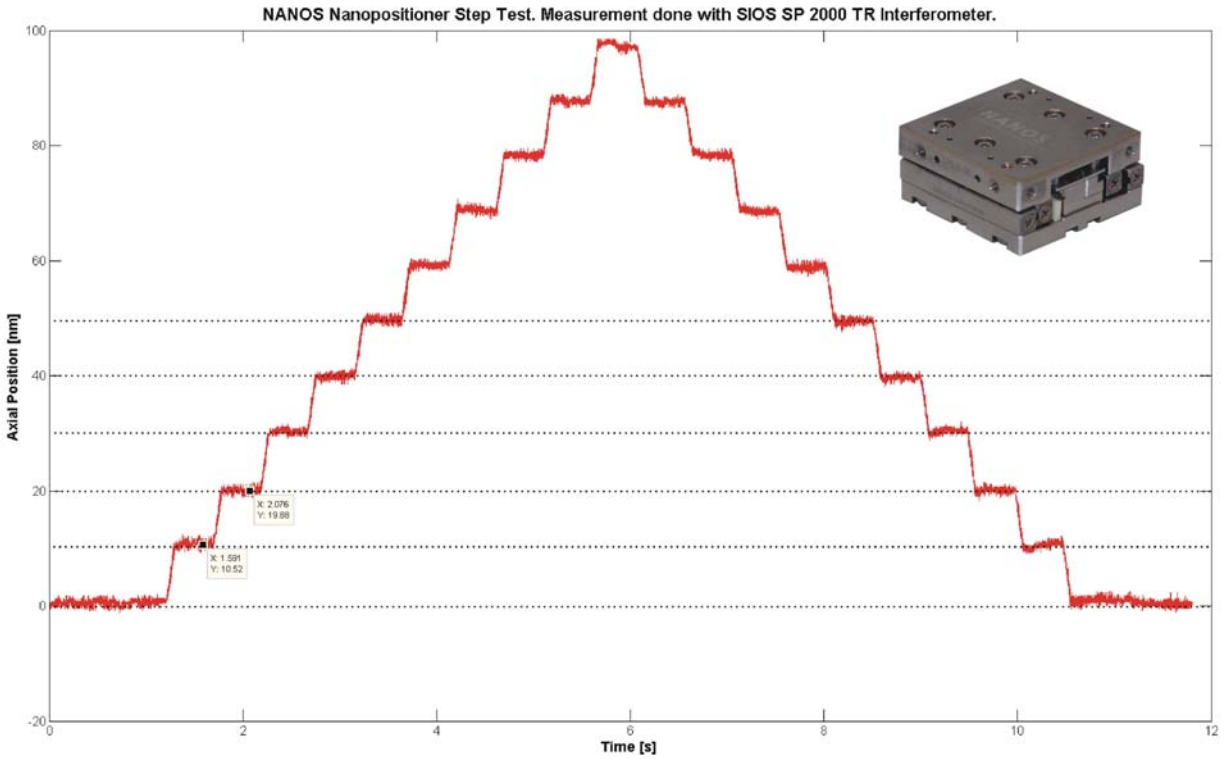
Pic 3) LPS-30-30 with mirror

We measured the LPS-30-30-1-1O-G-S-N prototype with a controller prototype in an capsulated chamber with constant temperature of 22°C +/-10mK and with out air draft. To be sure that there is no drift effect we don't touche anything hours before. Unfortunately the temperature regulation of the basis plate is defect and so switched off. Note allso that the mirror is mounted 30mm above and at the end of the stage. This is not the optimal position for best results.

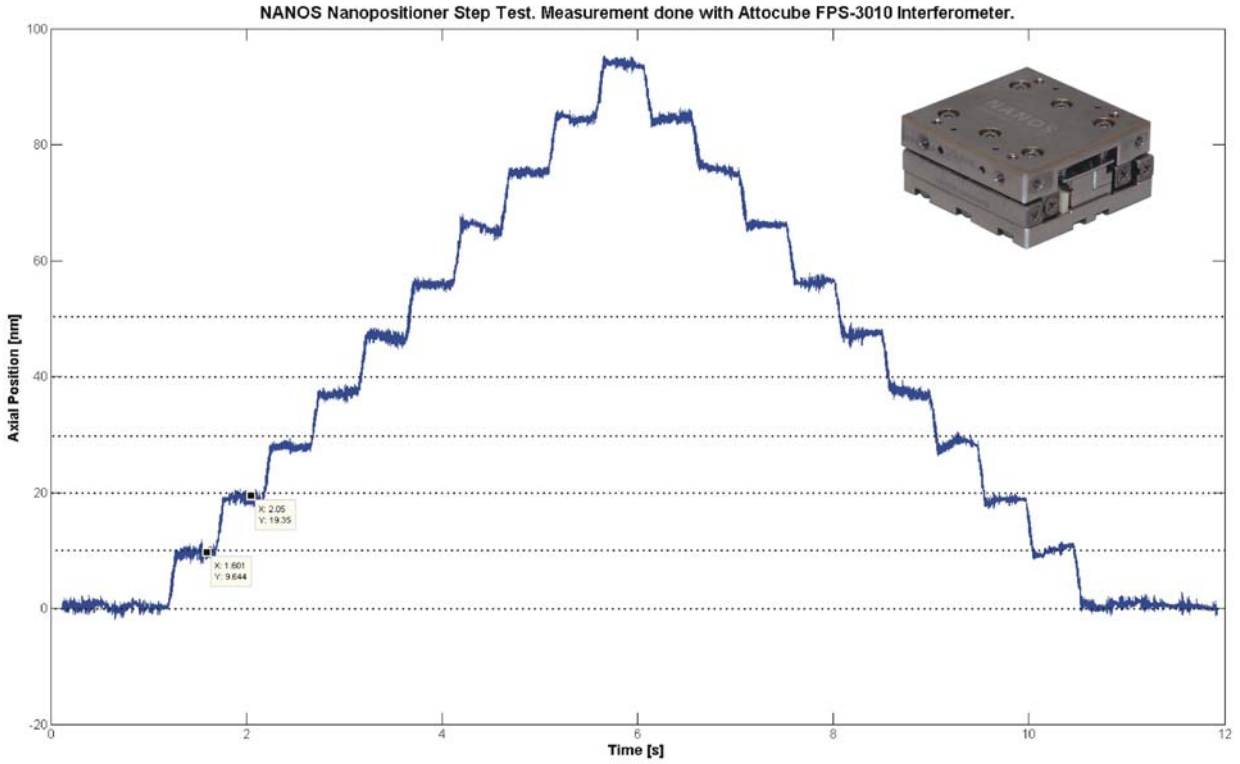
Conclusion: We could have a better situation but the result is already acceptable for this time.



Pic 4) shows the linearity of the movement. Full step of the motor is 4µm. Pitch of the scale 20µm. The diagramm is without velocity control.



Pic 5) The bidirectional repeatabiliy of the LPS-30 is very accurate, as shown with the SIOS SP 2000 TR. This interferometer has itselve a repeatabiliy of 0,1nm. The datas are the average of the three channels. The data are not filterd in this picture. The noise that you see is +/- 0,5nm. (30mm above the table)



Pic 6) Measured parallel at the same time from the backsite with the FPS-3010 showes allso a high repeatability. But why the steps are not so exact as the SP 2000 TR demonstrated is not clear to us. Maybe the reason is the 2nm repeatabiliy for this interferometer (datasheet Attocube) or that we measure with only one channal or other effects that we don't find out at that time. We show what we have measured with unchanged datas.

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We don´t want to compare the different interferometers at this point. For this we don´t have the equipment or expertise. My goal is to demonstrate the very high precision of our own system. The stage with integrated motor and our own integrated optical zero drift encoder togethere with the driver electronic. With this stage we are able to build very compact and easily a setup with interferometer precision quality. Don´t forget that our system is robust and immune aginst air draft or vibrations and has a homing position. So you are able to build your system outsite a chamber.
If you realy need an interferometer, have the time, space, and money we can offer you a system.
The pictures from the first site show the effort and size that is needed to measure with an interferometer.
There are many situations where an interferometer is realy helpful and the absolute position over a longer distance is much more precise than our system.

This document should show that the system LPS-30 has a repeatibility of +/- 1 encoder count (here +/- 0,5nm). This is the regulation range of the clossed loop controller to hold the position together with the noise oft the encoder.

Other stages from our competitors are promote very often with the resolution of 1nm but has a repeatibility of 50 to 150nm. Or I have seen often systems from customers which are 5K warmer then the setup. Then it is clear that the user need an interferometer. Mostly the competitors don’t show a diagram of the repeatability.

Some first product examples from us.