



AFRIMETS
Intra-Africa Metrology System
Système Intra-Africain de Métrologie



TCL- Length/dimensional feedback 2014

O Kruger



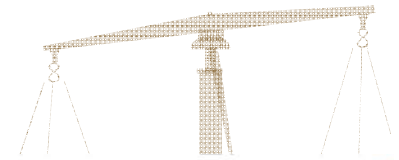
Length activities for 2013

•Comparisons:

- 1) SADC MET comparisons LS1, LS7 and LS11 was ended with only four NMIs submitting their results. Results were send to NMIs.
Recently artefacts become available from customs and is now at the Malawi NMI.
- 2) Two new end standards (gauge blocks) comparisons registered on the BIPM website.
AFRIMETS .L- S3 and L- S4.
Both for gauge blocks by mechanical measurements.
Both is at Draft A stage.
- 3) Challenges in performing training as-well as writing of technical guidelines.

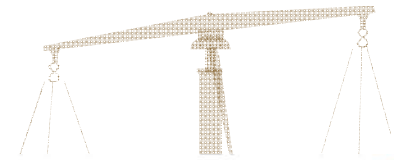
•Research

- South Africa and Egypt submitted a joint research project on interferometry measurements of gauge blocks, phase stepping technique.
-Part of project is comparison of end standards (gauge blocks)
- Line scale system developed for AFRIMETS NMIs



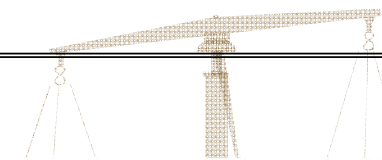
Length working group Roadmap (top priorities)

- MRA – Supporting of MRA through comparisons, submission of CMCs and review of other region's CMCs
- Technical Guidelines
- Training
- R&D projects



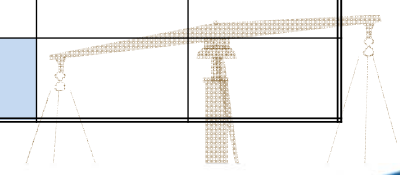
Comparison data base

Number	AFRIMETS comparisons	Status	Phase	Pilot laboratory	2012	2013	2014	2015	2016
Afrimets-LS7, 2014	Line scales up to 1 metre	Planned/link to R&D	0	NMISA					
Afrimets-LS?	Dial indicator	Planned	0	??					
Afrimets-LS?	External micrometer	Planned	0	??					
Afrimets-LS?	Calliper, vernier or digital	Planned	0	SIRDC/NIMSA??					
Afrimets LS3, 2012	Gauge blocks, up to 100 mm	Draft A	2	Egypt					
Afrimets LS4, 2012	Gauge blocks, up to 100 mm	Draft A	2	Tumisia					
Afrimets-LS5, 2014	Gauge blocks, up to 100 mm	Planned	0	SA					
	SADCMET comparisons	Circulating	3	NMISA					
SADC-LS 1	Gauge blocks, up to 100 mm	5 labs completed measurements							Stoppe d
SADC-LS 7	Line scale, 1 m rule	Only 4 send in results							Stoppe d
SADC-LS 11	External micrometer, 0-25 mm & 25mm-50 mm and two micrometer setting pieces								Stoppe d



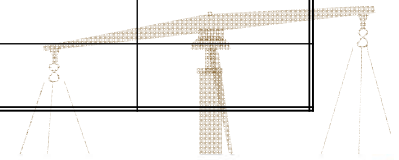
Training

Technical training	2014	2015	2016	2016	2018
Basic length	ongoing				
Gauge block by interferometry, including basic distance interferometry					
Line Scale					
Long distance base line, including GPS.					
Length bars/long serious slip gauges					
Other training					
CMC submission					
Pilot of comparisons					



Technical Guidelines

Technical guidelines, procedures					
	2013	2014	2015	2016	2017
Gauges by comparisons					
Micrometer and vernier calliper					
Thickness gauges					
Angle, levels, Protractor, squares					
Line scales					
Some of the research projects will lead to TG					



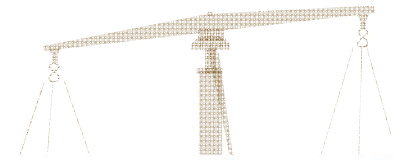
R&D

Research projects	2013	2014	2015	2016	2017
Double ended interferometer for use in gauge block calibrations	■	■	■		
Long base line, including GPS calibrations				■	■
Line scale system	■	■	■		
Compass, true north calibrations			■	■	■



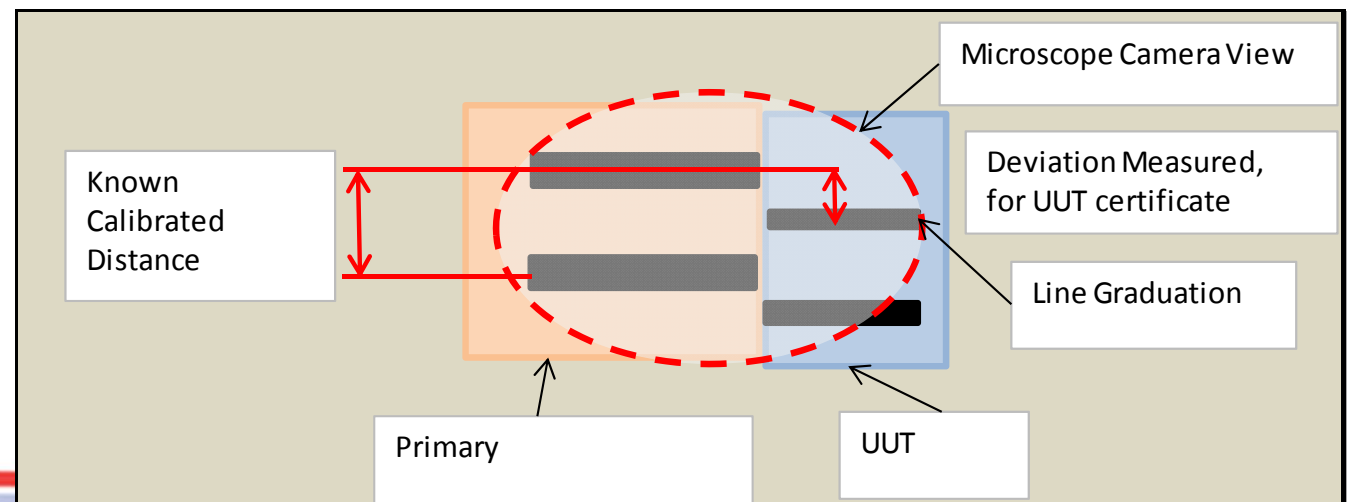
Strategy for Research & Development

- **Perform research into metrology areas specific to Africa.**
- **Development of measuring systems.**
- **Through this research, develop Human Capital-training of line scale systems**
- **Get AFRIMETS NMIs involve in R&D not only for development of measuring system but also of scientific research.**



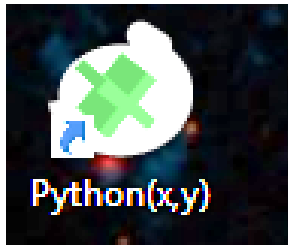
Development of line scale system for AFRIMETS NMIs

Accuracy Requirement versus Ability		
Current	Rule	$\pm 0,50$ mm Uncertainty
OIML Class 1	Rule, 1 metre	$\pm 0,20$ mm Specification
Proposed System	Rule, 1 metre	$\pm 0,05$ mm Uncertainty

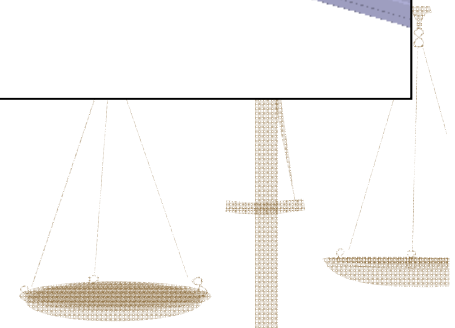
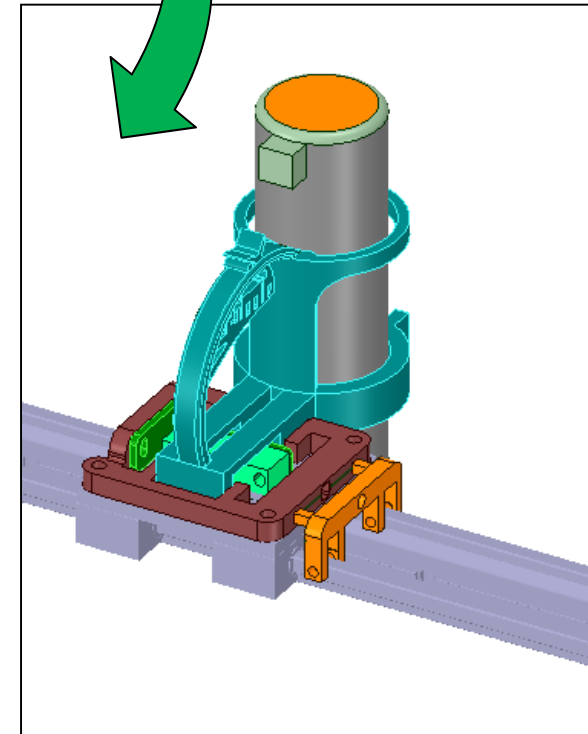
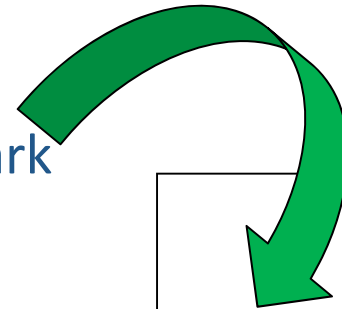
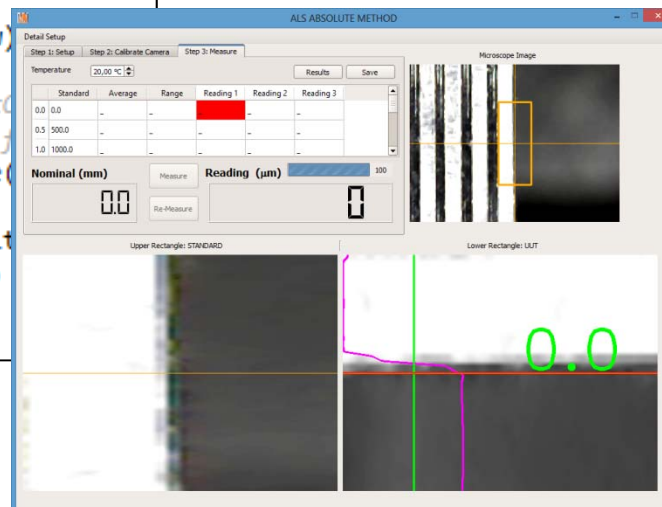


Development of line scale calibration system

- Software application in Python
- Component design in DesignSpark Mechanical
- 3D Print Components

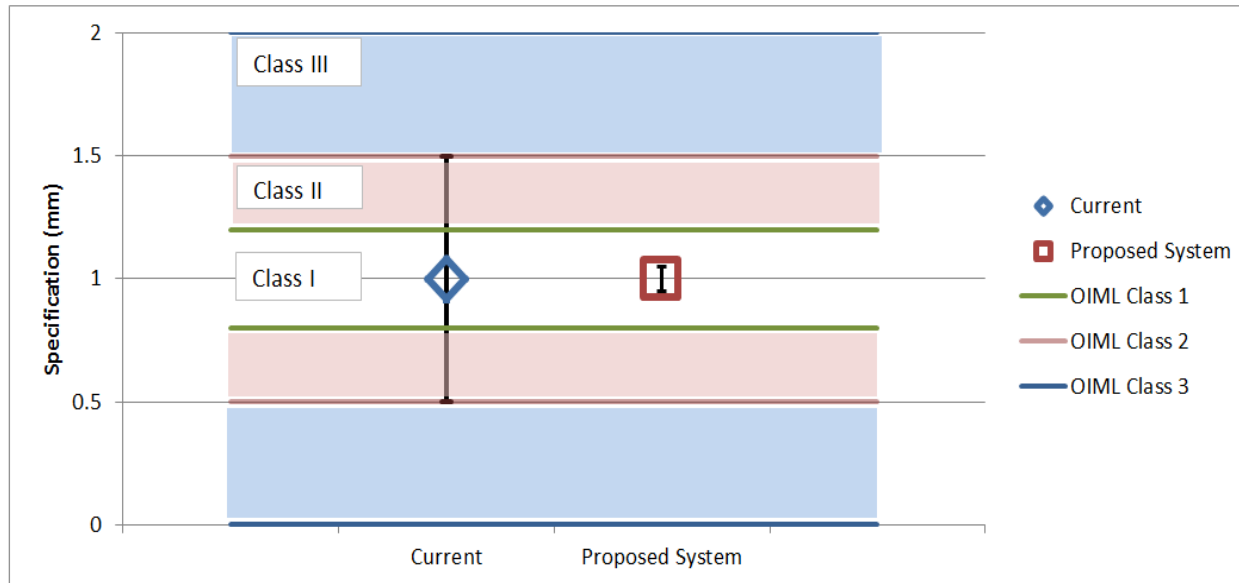


```
30
31
32 class mainApp(QtGui.QMainWindow):
33     def __init__(self):
34 #         QtGui.QApplication.set
35 #         #load als configs from j
36         self.configLoadFromFile(
37         #init UI
38         QtGui.QMainWindow.__init
39         self.ui=Ui_MainWindow()
40         self.ui.setupUi(self)
41         self.move(0,0)
```

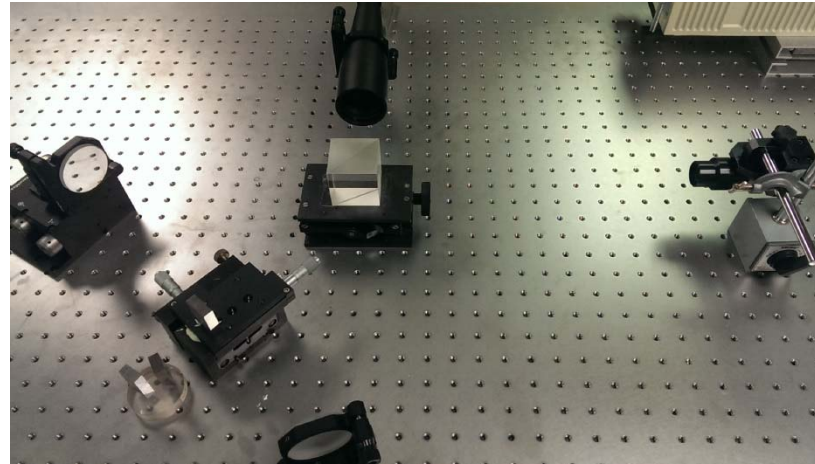


Development of line scale calibration system.

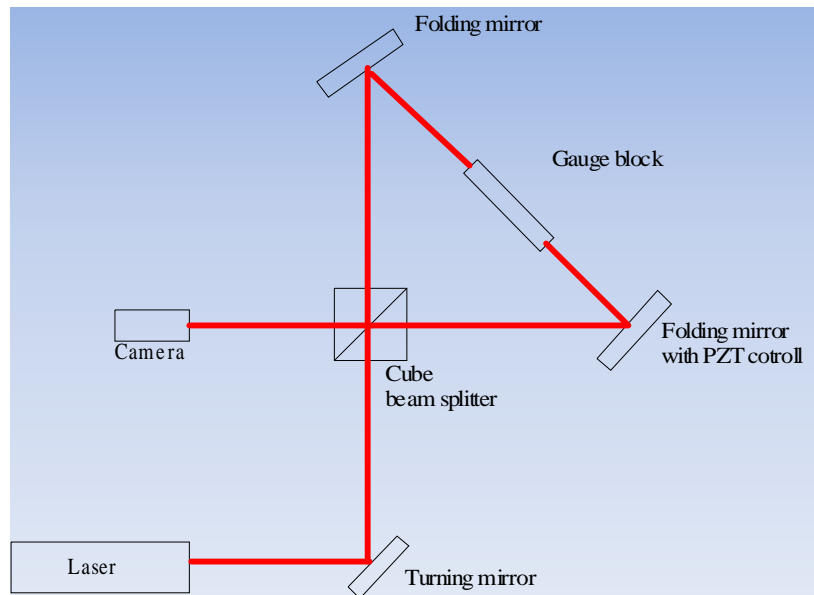
PTB sponsor system and training, laboratory must travel to South Africa on own cost



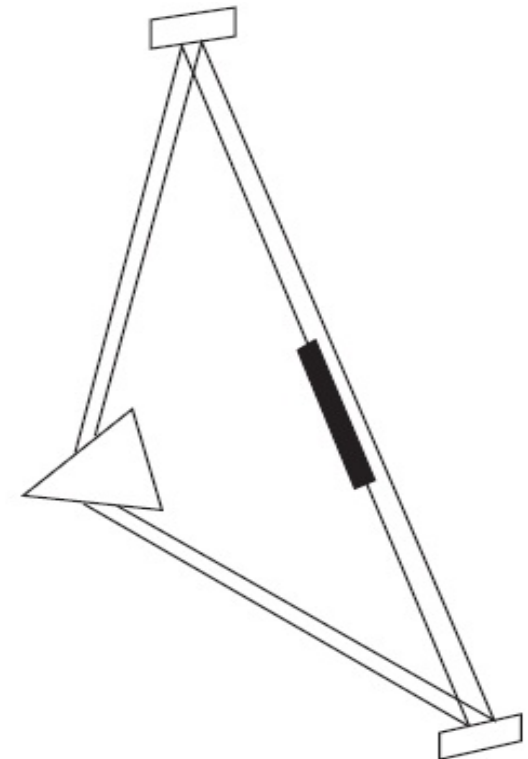
Double ended interferometer for the calibration of gauge blocks



NMISA layout



NIS layout





3D ceramic printing

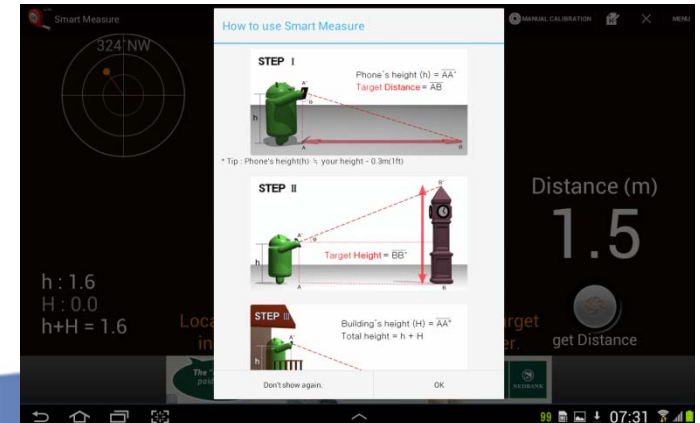


Future R&D Projects



Cell phone apps

DTI tester



Thank you

