

## Division of Electrical and Electronic Metrology

Collected and Presented

By

Dr. Eng. Mohammed Helmy Abd El-Raouf  
Ph. D. in Electrical Engineering

Researcher in

National Institute of Standards (NIS)

المؤتمر العربي الأول للقياس و المعاييرة – القاهرة ٦-٨ نوفمبر ٢٠٠٧

## Division of Electrical and Electronic Metrology

High Voltage  
Lab.

Time and  
Frequency Lab.

Systems and  
Information  
Metrology Lab.

Lab. of Power For  
High Frequency  
Ranges

Electrical  
Quantities  
Metrology Lab.

المؤتمر العربي الأول للقياس و المعاييرة – القاهرة ٦-٨ نوفمبر ٢٠٠٧

### 1- High Voltage lab.

- Calibration of Ac H.V. Sources 400 [kV] & Measuring Instruments up to 200 [kV] (50 Hz ).
- Calibration of DC H.V. Sources and Measuring Instruments up to 140 [kV].
- Calibration of Oil Testers up to 60 [kV].
- Calibrating Current Sources up to 3000 [A].
- Calibration of AC Current Measuring Instruments up to 5000 [A] ( 50 Hz ).
- Calibration of Current Measuring Clamp meters up to 1000 [A] DC and AC (10Hz - 100 kHz).
- Calibration of Insulation Resistance Measuring Instruments up to 600 [GΩ ] (for DC voltage source up to 5000 [V]).

المؤتمر العربي الأول للقياس و المعاييرة - القاهرة ٦-٨ نوفمبر ٢٠٠٧

- Insulation AC Breakdown Test up to 100 [kV] (50 Hz).
- Calibration of Current and Transformers (CT).
- Calibration of Transformers (PT).
- Testing of Transformer Oil.

### Energy & power unit (HV)

- Calibration of sub-standard energy meters of classes 0.2, 0.5 and 0.1%, with voltage from 40 V-320 V Phase to neutral and current from 1mA - 120 A with all possible phase shift.
- Calibration of energy and power analyzer with voltage from 40 V - 320 V Phase to neutral and current from 1mA - 120 A with all possible phase shift.

المؤتمر العربي الأول للقياس و المعاييرة - القاهرة ٦-٨ نوفمبر ٢٠٠٧



- Calibration of power meters with voltage from 40 V- 320 V Phase to neutral and current from 1mA - 120 A with all possible phase shift.
- Calibration of power ,current ,voltage and frequency transducers with voltage from 1m V - 1000 V DC and AC Phase to neutral and current from 1mA - 120 A DC and AC.
- Calibration of power factor meters for all possible phase shift.
- Calibration of power sources with voltage from 30V -480 V AC Phase to neutral and current from 1mA - 120 A.
- Calibration of Automatic voltage regulators.

المؤتمر العربي الأول للقياس والمعايرة - القاهرة ٦-٨ نوفمبر ٢٠٠٧

## 2- Time and Frequency Lab.

- Maintaining the primary frequency standard for Egypt.
- Operating standard of time and frequency.
- Coordinating Egyptian time and frequency standard with other world standard.
- Providing time and frequency services for Egyptian clients.
- Performing research in support of services.
- Providing National traceability in time and frequency to Egyptian Labs.
- Training courses in Time and frequency and estimation of Uncertainty.

المؤتمر العربي الأول للقياس والمعايرة - القاهرة ٦-٨ نوفمبر ٢٠٠٧

- Consultation in upgrading Time and frequency labs to comply with ISO 17025 .



**Controlled Cesium Clock and the International Frequency Traceability System with Accuracy of  $5 \times 10^{-13}$**

المؤتمر العربي الأول للقياس والمعايرة - القاهرة ٦-٨ نوفمبر ٢٠٠٧

- The time is traceable to BIPM while the Freq. is traceable to NIST
- Frequency standards oscillators (Cs, Rb, Qz)
- Signal generators.
- Frequency counters.
- Timers and stopwatches.
- Oscilloscopes, Spectrum Analyzers.
- Tachometers Testers, Tachometers, RPM.
- Medical Equipments (time/frequency dependant).

المؤتمر العربي الأول للقياس والمعايرة - القاهرة ٦-٨ نوفمبر ٢٠٠٧



### Time Dissemination:

- The National Institute of Standard (NIS) and the National Institute of Standards and Technology (NIST) are implementing a satellite-based time and frequency dissemination system for Egypt based on NILESAT platform.

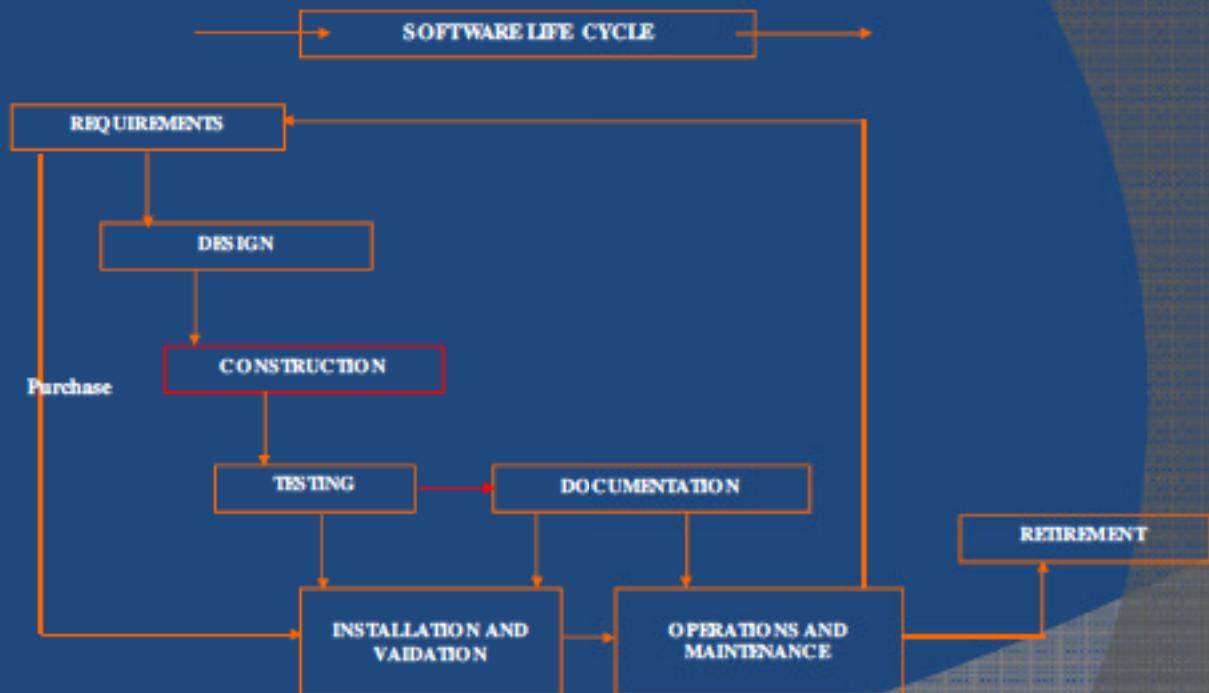


المؤتمر العربي الأول للقياس و المعاييرة – القاهرة ٦-٨ نوفمبر ٢٠٠٧

### 3- Systems and Information Metrology Lab.

- Developing highly accurate customized software for mathematical and statistical processing of data to help the industry to comply with the international standards.
- Driving measurement instruments by the computer and developing the software required to maximized utilization of these highly accurate (expensive) measurement instruments smoothly and accurately.
- Software testing to standards using specialized method searching using modern scientific techniques.
- Training, consultancy, designing and implementing automatic control system.

المؤتمر العربي الأول للقياس و المعاييرة – القاهرة ٦-٨ نوفمبر ٢٠٠٧



المؤتمر العربي الأول للقياس و المعاييرة – القاهرة ٦-٨ نوفمبر ٢٠٠٧

#### 4- Lab. of Power for High Frequency Ranges

- Realization of the Definition of Power standard quantity in Frequency range 100 MHz to 18 GHz.
- Realization of traceability to international standard.
- Development of secondary standard.
- Calibration services to industry.
- Calibration services and training courses.

المؤتمر العربي الأول للقياس و المعاييرة – القاهرة ٦-٨ نوفمبر ٢٠٠٧

## 5- Electrical Quantities Metrology Lab.

- Maintenance and Dissemination of the national electrical standards of Dc voltage, resistance, capacitance, Inductance and AC/DC transfer.
- Improving and establishing the reliability of the primary reference standard and the scale of measurement values, along with the inter-comparison techniques.
- Performing highly accurate calibration of secondary and working standards by direct comparison to the national standards or the reference standards.
- Development of the measurement methods to support calibration at the highest levels of accuracy.

المؤتمر العربي الأول للقياس والمعايرة - القاهرة ٦-٨ نوفمبر ٢٠٠٧

- Researches in the areas of advanced electrical measurement technologies.
- Verifying our consistency of the Lab with other national laboratories through international inter-comparison.
- Assist industrial and services firms in solving their problems connected with accurate electrical measurements.
- Giving advices and training in all purposes related to accurate electrical measurements for industry and other Arab countries.
- Helping companies to fulfill the requirements of ISO guide or to establish level B or C laboratories.
- During the year 2008 the laboratory will have the "Josephson" effect that represents the SI unit of voltage.

المؤتمر العربي الأول للقياس والمعايرة - القاهرة ٦-٨ نوفمبر ٢٠٠٧



شعبة متروlogيا القياسات الكهربائية والإلكترونية – المعهد القومي للقياس و المعاييرة



**Traceability of voltage and resistance units to the BIPM is achieved by regular calibrations at the BIPM.**

المؤتمر العربي الأول للقياس والمعايرة - القاهرة ٦-٨ نوفمبر ٢٠٠٧

شعبة متروlogيا القياسات الكهربائية والإلكترونية – المعهد القومي للقياس و المعاييرة



المؤتمر العربي الأول للقياس والمعايرة - القاهرة ٦-٨ نوفمبر ٢٠٠٧



**Thanks  
For Your  
Attention**

