

# Brief report from INETI, Portugal to the 5th meeting of CCAUV

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## Quality System:

As a primary laboratory, INETI participated on the EUROMET Project INITIATION and has implemented a Quality System according to EN ISO/IEC 17025.

## Vibration:

The activity on the vibration domain started in INETI in 1975 with vibration testing of in house developed electronic equipment.

When INETI was invited to participate in the first meeting of the Vibration Working Group in Berlin on March 1999, the development of an interferometric laser system for the acceleration measurement was already underway.

The participation in the meetings of the working group increased the involvement on this subject and now, after demonstrating the new calibration capabilities through the participation on EUROMET AUV.V-K1, INETI will apply this month of September 2006 to the respective entries on the CMC's data base.

At this moment the measurements for the EUROMET Project 897 are taking place. With this participation the demonstration of the capabilities at higher frequencies is foreseen.

INETI uses an interferometric system with homodyne and heterodyne configurations for lower and higher frequencies respectively. This system was completely developed and built in house and allows the calibration of standard accelerometers for a frequency range between 10 Hz and 10 kHz and accelerations between 0,5 and 400  $\text{m}\cdot\text{s}^{-2}$ .

The working range of the two sub systems considering the pairs frequency/acceleration, is defined by the limitations of the two interferometer characteristics:

- homodyne interferometer:
  - displacement limits between 6,3 mm and 200 nm ( $\approx \lambda/3$ );
- heterodyne interferometer:
  - maximum detectable speed of  $8 \text{ mm}\cdot\text{s}^{-1}$  (due to the lock-in maximum sampling rate of 25 kHz ( $\lambda/2 \cdot 25 \text{ kHz}$ );
  - minimum detectable displacement amplitude of  $\lambda/100$ .

With the homodyne interferometer, the expanded uncertainty obtained is in the order of 1 % within the working range.

In the case of the heterodyne interferometer, the expanded uncertainty of the results varies from less than 0.1 %, for  $f < 2$  kHz and  $1 \text{ m.s}^{-2} \leq a \leq 100 \text{ m.s}^{-2}$  and up to 5% for  $f \geq 1$  kHz and  $a \leq 100 \text{ m.s}^{-2}$ .

### Acoustics:

INETI was recently invited to take responsibility for the primary standards of acoustics. Since then, the implementation of a primary calibration system for microphones is planned for 2007.

Some documentation and a few hardware items were already ordered.