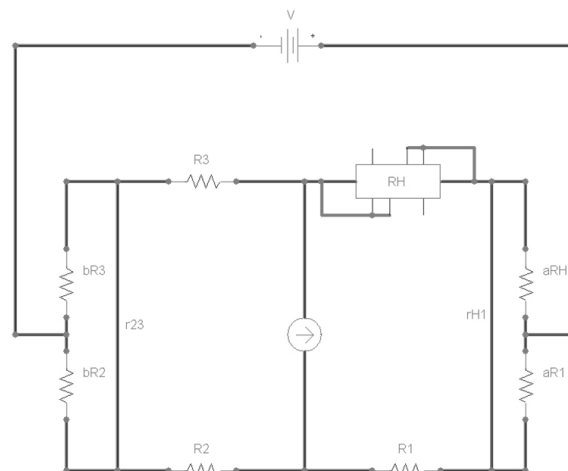


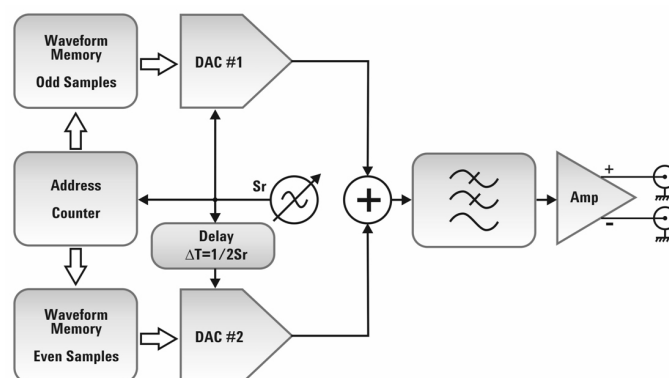
**0001**  
Invited Talk**The National Measurement Standards at CEM and their Role in MRA and EMRP Projects**M. Neira - CEM (Centro Español de Metrología), Tres Cantos, Spain, [mneirar@cem.minetur.es](mailto:mneirar@cem.minetur.es)

This talk presents a view about the role of the CEM national measurement standards in the framework of the Mutual Recognition Arrangement, MRA, of the International Committee for Weights and Measures, CIPM, and simultaneously as they used as a base in their participation in European Metrology Research Program, EMRP, projects. During last years the strategy of EURAMET and of its members National Metrology Institutes, NMIs, has been directing their efforts toward a joint participation in the EMRP. Centro Español de Metrología, CEM, is the organization responsible for the metrological infrastructure in Spain, and must establish and maintain the necessary technical-scientific infrastructure in order to reproduce the national standards of the measurement legal units in Spain. The EMRP allows at all NMIs, industrial organizations and academic bodies to collaborate on joint research projects within metrology specific fields. On the other hand, CEM realizes and promotes the research and development projects in the metrology field, as a necessary support in order to assure the quality of industry.

Keywords: National measurement standards, MRA, EMRP, EURAMET, NMIs, Key Comparisons, Degree of equivalence

**Warshawsky bridge****0002**  
Invited Talk**New Architectures for High-Performance Arbitrary Waveform Generators (AWG)**Joan Mercade - Arbitrary Resources, Barcelona, Spain, [joan.mercade@arbitrary.es](mailto:joan.mercade@arbitrary.es)

Arbitrary Waveform Generators (AWG) are the most flexible stimuli instruments available to any design and test engineer or scientist. Their ever growing application areas are fuelled by performance improvements in data conversion technologies and the introduction of new AWG's architectures. Applications in the RF or optical signal generation domains are only possible thanks to the new generation of instruments with up to 50 GSa/s and 80dBc spurious-free dynamic range. This presentation is an introduction to the latest conversion technologies used in AWGs such as dual-core, distributed resampling, and segmented DACs applied to the new AWG architectures introduced by the leading generator manufacturers including the interleaving-DAC, the TrueForm, the "doublet" mode, and the digital up-conversion architectures.

**AWG with Interleaved-DAC**