

## ***"Utilizing Reverberation Chambers as a Versatile Test Environment for Assessing the Performance of Components and Systems"***

**Abstract:** Electromagnetic reverberation chambers have been used for many years by the Electromagnetic Compatibility (EMC) community to measure the susceptibility and emissions for various electronic components and systems. This presentation describes how statistical processes were used to reduce the uncertainty of these chambers to a level necessary for precision metrology applications. These processes were applied to the calibration of electromagnetic field probes and the assessment of antenna efficiencies. A brief comparison of traditional calibration methods employing transverse electromagnetic (TEM) cells and anechoic chambers to the new statistical reverberant environment will be shown.

The presentation also shows how these techniques were later applied to a wide variety of aircraft measurements. A technique which utilizes two side by side reverberation chambers sharing a common wall with an arbitrary shaped aperture, useful for the assessment of component shielding, will be discussed. Utilizing this same approach, it is also possible to assess the shielding of large structures such as commercial aircraft. These aircraft shielding measurements are necessary for High Intensity Radiated Field Susceptibility (HIRF) certifications.

With the proliferation of wireless devices, it is important to understand how they behave in complex electromagnetic environments and how they interact with other devices and systems with which they are collocated. Aircraft environments have been shown to behave similarly to reverberation chambers and therefore these techniques can be employed to study propagation environments and system interactions. This presentation will provide examples of how these techniques were employed to measure bulk absorption used to simulate passenger loading of aircraft, field mapping which is useful for the evaluation of signal coverage and channel interference, as well as signal propagation characteristics.

By the conclusion of the presentation, attendees will understand the basic test methodology of reverberation chambers and how they may be used for cost effective and efficient testing of a wide variety of devices as well as for diverse applications.