Course Catalog Number: Tem-1
Course Track: Electrical Measurements
Course Topic: Time and Frequency
Course Career Level: Intermediate

Saturday, August 24 | 8:00 AM - 5:00 PM | 1-Day (8 Hours)

Course Title: Time and Frequency Measurements Using GPS

Instructor: Michael Lombardi, National Institute of Standards and Technology (NIST)

Abstract: Global Positioning System (GPS) disciplined oscillators and clocks serve as standards of frequency and time in numerous calibration and metrology laboratories. These devices are inherently accurate sources of both frequency and time because they are adjusted via the GPS satellites to agree with the Coordinated Universal Time (UTC) time scale maintained by the United States Naval Observatory (USNO). Despite their excellent performance, it can be difficult to evaluate their uncertainty, and even more difficult for metrologists to prove their claims of uncertainty and traceability to skeptical laboratory assessors. This tutorial is for metrologists and laboratory assessors who work with GPS disciplined oscillators (GPSDOs) or GPS disciplined clocks (GPSDCs). It describes the relationship between GPS time and Coordinated Universal Time (UTC), explains why GPS time is traceable to the International System (SI), and provides methods for evaluating the frequency and time uncertainty of signals produced by a GPSDO or GPSDC.

Learning Objectives:

1. Understanding how GPS disciplined oscillators and clocks serve as frequency and time references
2. Understanding how GPS disciplined oscillator or clock can provide traceability to the SI
3. Understanding how to evaluate the frequency and time uncertainty of a GPS disciplined oscillator or clock

Instructor Curriculum Vitae (CV): Michael Lombardi works in the Time and Frequency Division of the National Institute of Standards and Technology (NIST). He has served as the quality manager for the Time and Frequency Division since 2005 and as the project manager for its remote calibration services since 1993. His research interests include time and frequency transfer, international clock comparisons, disciplined oscillators, and radio and network time signals.