



SPHEREA

# SPHEREA TEST & SERVICES

## IEEE 1641 User/Developer Three Day Training Course

### Introduction

IEEE Std 1641 (IEEE Standard for Signal and Test Definition) is the standard which is now mandated by MOD policy for new Automatic Test Systems or Test Program Sets. This standard also supports both the ATML (Automatic Test Markup Language) suite of standards and the DoD's ATS (automatic test system) Technical Framework. Spherea is offering a three day course covering how to use the standard and how to develop and use signals, signal models and signal libraries.

### Benefits

Portability of test information is an essential prerequisite for the overall reduction of the whole life cost of test. Using IEEE 1641 provides an ATS independent method of describing tests, and enables an organisation to provide portable test information that complies with current MOD policy, realising the benefits promoted by the standard and protecting the investment made in the development of the test programs. Understanding how to create test signals that are fully supported by a sound mathematical underpinning, is an essential prerequisite for providing portable test requirements. This knowledge is paramount for those who will be part of a team developing test programs that have to comply with the requirements of MOD policy.

### Course objectives

This course provides an understanding of IEEE Std 1641 and explains how it is used in the development of test systems and requirements. It shows how to create test requirements that are based upon signals defined with mathematical rigour. It demonstrates how signals may be designed for reuse and combined to form a project based signal library. The course includes a practical element in which delegates gain hands-on experience on how signals and libraries are created.

### Who should attend

This course is essential for technical leads and engineers who are responsible for the specification, development and implementation of test requirements and programs. It also provides valuable information for those involved in the design and development of IEEE 1641 compliant Automatic Test Systems.



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Registered in England & Wales No: 4656204



## Course content

- Introduction and an overview of IEEE Std 1641.
  - ✦ Structure of the standard
  - ✦ Using signals
  - ✦ Mathematical underpinning of signals
- Introduction to IEEE 1641 signals
  - ✦ Composition of a signal
  - ✦ Modelling, simulating and verifying signals
  - ✦ Signal types
- Signal elements
  - ✦ Basic Signal Components (BSCs)
  - ✦ Events
  - ✦ Signal Example using BSCs
- How to do measurements
  - ✦ Measurement description
  - ✦ Measurement methods and terms used with measurement
  - ✦ Measurement in different domains
  - ✦ Generic Measurement
- Test Signal Frameworks (TSFs)
  - ✦ TSF models, signal interfaces and attributes
  - ✦ TSF libraries
  - ✦ Using TSF libraries
- A case study
  - ✦ An ATLAS measurement statement (study example)
  - ✦ Analysing the requirement
  - ✦ Triggering, combining events, signal conditioning and location
  - ✦ The complete measurement in IEEE 1641
- Programming with IEEE 1641
  - ✦ Programming methods
  - ✦ Using IEEE1641 XML signals
  - ✦ Using the IEEE 1641 IDL interface
  - ✦ 1641 within ATML Test Description (IEEE 1671.1)



- Examples.
  - ✦ Multiple intrinsic measurements
  - ✦ Generic measurements
  - ✦ Pulses and Bursts
  - ✦ Time Intervals
  - ✦ Measuring multiple values
- Conclusions & summary.

### Course organisation

- Courses are held at our Ferndown training centre.
- Refreshments and lunch are included.
- Course notes are provided for all attendees.
- Training will be supported by *newWaveX™*–SD, the signal development variant of the leading IEEE 1641 toolset.
- Course fee includes a licence for *newWaveX™*–Lite, the entry-level variant of the *newWaveX™* toolset.
- Courses may be provided at customer's premises by special arrangement.
- For available dates and course prices, please contact Spherea.

### Related Courses

- IEEE 1641 Management Overview
- Open System Architecture & IEEE 1641
- IEEE 1641 Technical Primer
  
- *newWaveX™*–SD User/Developer
- *newWaveX™*–SD Integration Support
- *newWaveX™*–PD Integration Support

### Note

- The IEEE 1641 User/Developer course is a prerequisite for anyone for any of the *newWaveX™* specific developer course or integration support.



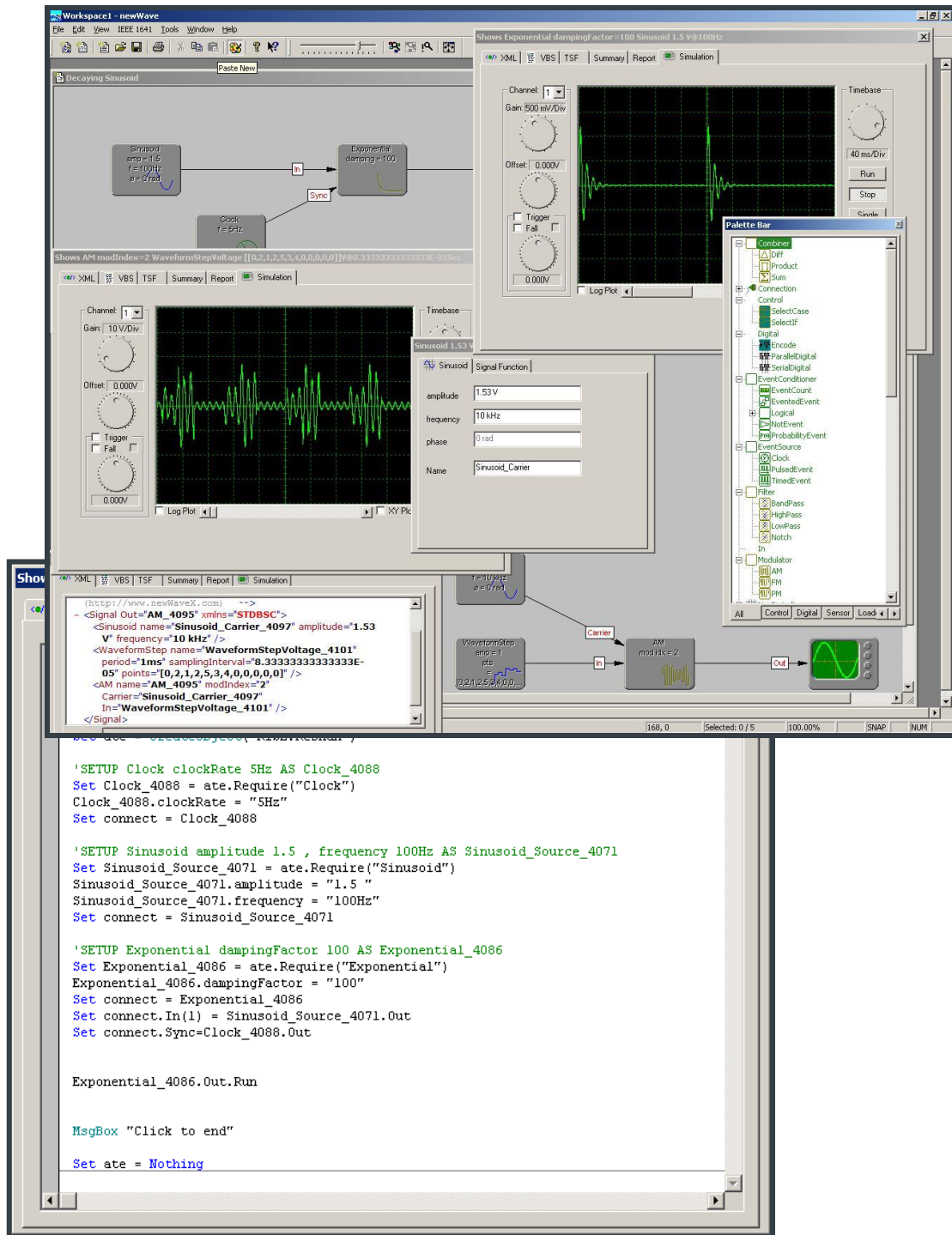
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## newWaveX Signal Development

- Screenshots of IEEE 1641 signals being developed using newWaveX™-SD.

The screenshot displays the newWaveX software interface for signal development. It features a block diagram at the top showing a Sinusoid block (amp=1.5, f=100Hz, phi=0rad) connected to an Exponential damping block (dampingFactor=100), which is then connected to an AM mod block (modIndex=2). A Clock block (f=5Hz) is connected to the Exponential damping block via a Sync connection. Below the diagram are two waveform plots: one showing a decaying sinusoid and another showing an AM-modulated signal. A control panel on the right allows for adjusting gain (500 mV/Div), offset (0.000V), and trigger settings. A palette bar on the right lists various signal processing blocks like Combiner, Diff, Product, Sum, Connection, Control, SelectCase, SelectIf, Digital, Encode, Filter, Modulator, and Sensor. A code editor at the bottom shows the following code:

```
'SETUP Clock clockRate 5Hz AS Clock_4088
Set Clock_4088 = ate.Require("Clock")
Clock_4088.clockRate = "5Hz"
Set connect = Clock_4088

'SETUP Sinusoid amplitude 1.5 , frequency 100Hz AS Sinusoid_Source_4071
Set Sinusoid_Source_4071 = ate.Require("Sinusoid")
Sinusoid_Source_4071.amplitude = "1.5"
Sinusoid_Source_4071.frequency = "100Hz"
Set connect = Sinusoid_Source_4071

'SETUP Exponential dampingFactor 100 AS Exponential_4086
Set Exponential_4086 = ate.Require("Exponential")
Exponential_4086.dampingFactor = "100"
Set connect = Exponential_4086
Set connect.In(1) = Sinusoid_Source_4071.Out
Set connect.Sync=Clock_4088.Out

Exponential_4086.Out.Run

MsgBox "Click to end"

Set ate = Nothing
```