

# **Graphic User Interface for High and Low Channel Count DATAQ and Recorder Systems**

James M Nieters

DSPCon, Inc

380 Foothill Road

Bridgewater NJ 08807

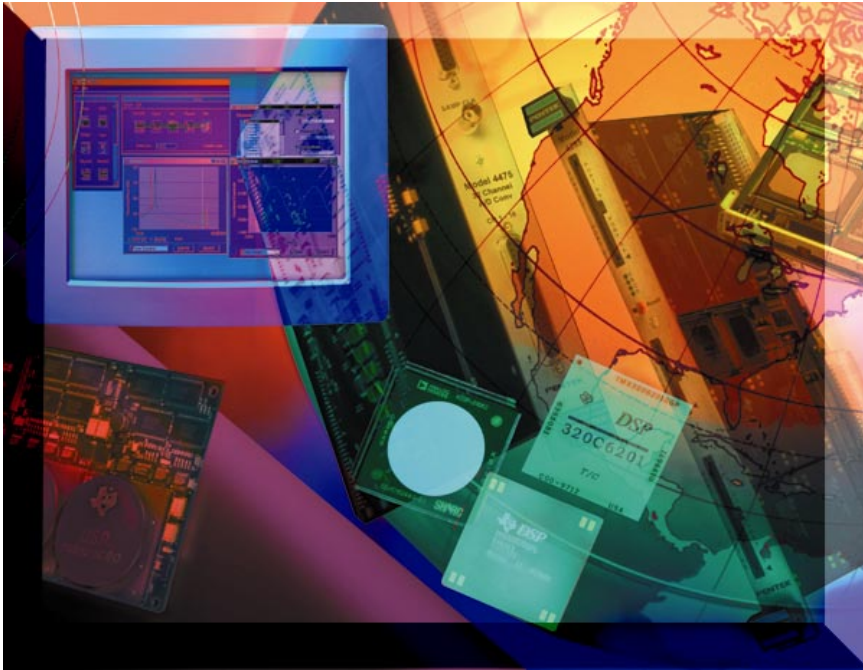
Phone: +1-908-722-5656, Fax: +1-908-722-3259

e-mail: [jmn@dspcon.com](mailto:jmn@dspcon.com)

THIC Meeting at Hotel Villa

San Mateo CA 94403-4537

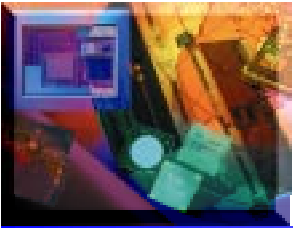
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**James M. Nieters**  
**DSPCon, Inc.**  
**380 Foothill Rd.**  
**Bridgewater, NJ 08807**  
**(908) 722-5656 tel**  
**(908) 722-3259 fax**  
**jmn or info @dspcon.com**  
**www.dspcon.com**

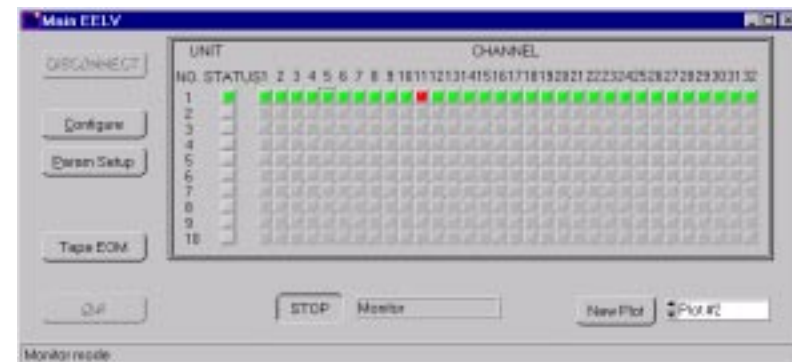
## **Graphic User Interfaces for High and Low Channel Count DATAQ and Recorder Systems**





# The Tasks at Hand:

- GUI or HMI?
  - ◆ Human Machine Interface
- Control without complexity
- Acquisition of valid data
- Monitoring without confusion
  - ◆ Real-time vs. Visual Real-time
- Expansion without constraints
- Cost & Development Time vs. COTS

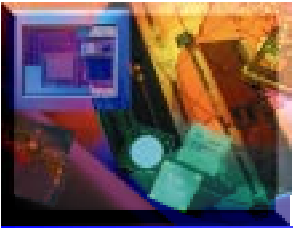




# Four HMI/GUI Examples

- Multi-purpose ruggedized recorder
  - ◆ No GUI, LCD remote control
- Serial (PCM) sonar recorder
  - ◆ Simple GUI to match past
- Windtunnel DATAQ
  - ◆ 320 channels - simple functionality
- Vibration monitoring, processing and acquisition system
  - ◆ 32 channels - complex functionality





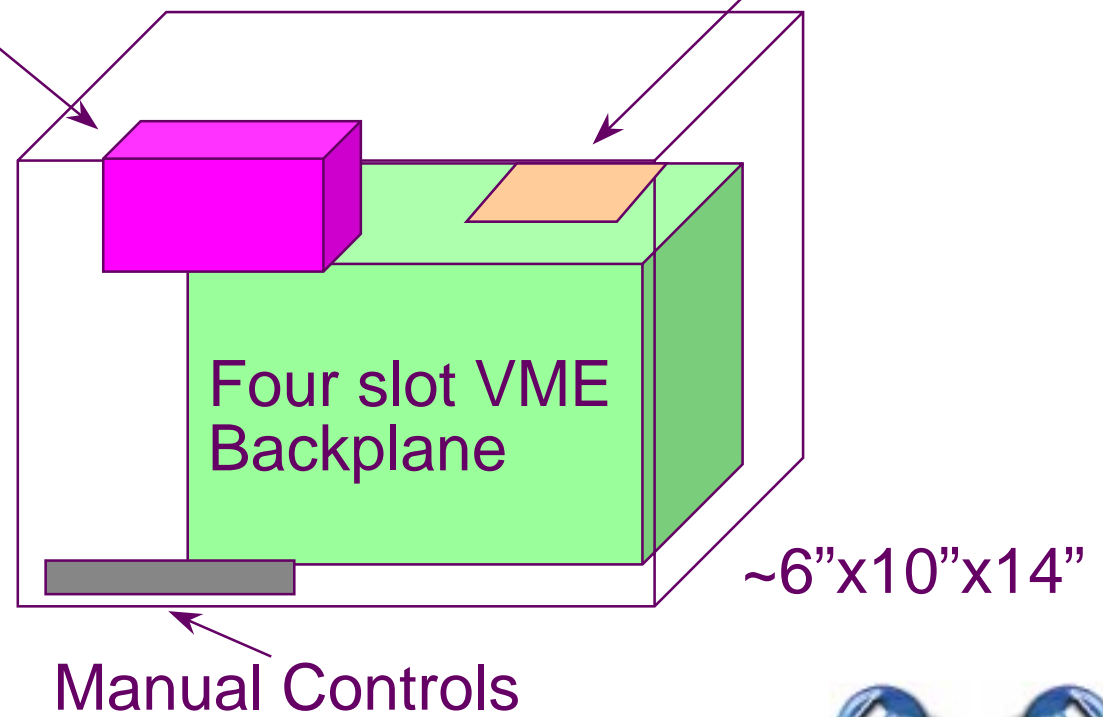
# PE DCMR-24 Digital Recorder

24 Mbit/s with 25 GByte uncompressed capacity  
uses SONY's AIT tape, 28 VDC supply  
16-32 Ch. Analog, 2 Ch. Video, Serial and/or 1553



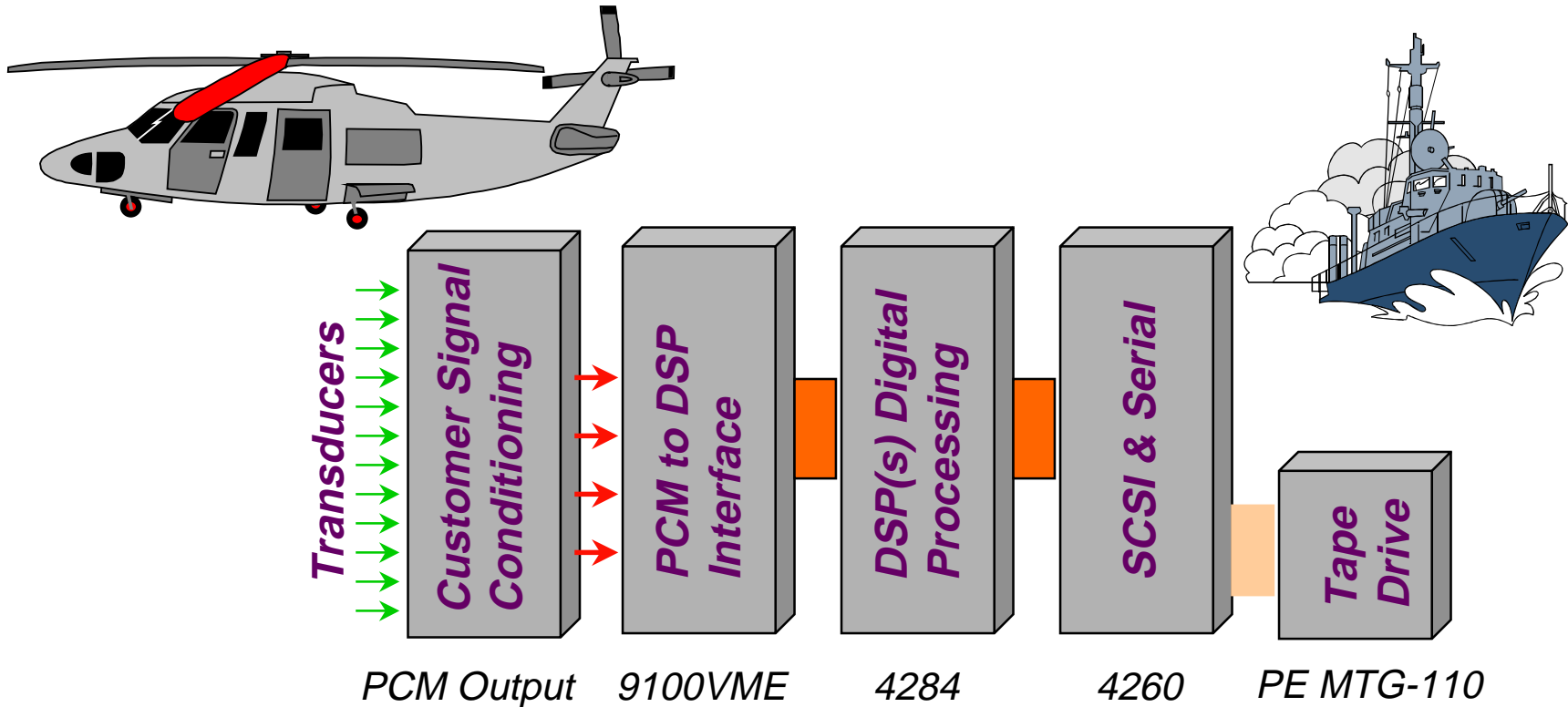
SONY SDX 3.5" drive

Serial Controller





# Ocean Floor SONAR Mapper





# Ocean Floor SONAR Mapper GUI

UT-ARL Data Recorder: /node2/t84b/0 (@fred)

**RECORDING** 13:22:21  
18 FEB 1998

Tape Usage [%] 7.941790 0.00 50.00 100.00  
Tape Position [%] 7.941790 0.00 50.00 100.00

signal found

18 Feb 1998	13:17:56	RECORDING START
18 Feb 1998	13:18:06	signal search
18 Feb 1998	13:19:35	signal found
18 Feb 1998	13:20:27	signal noise, high frequency spike
18 Feb 1998	13:21:00	signal strength regained
18 Feb 1998	13:21:28	signal noise
18 Feb 1998	13:21:34	signal lost
18 Feb 1998	13:22:02	establishing signal search
18 Feb 1998	13:22:12	signal found

System configuration completed

Search/Skip Mode

Search by time stamp  
18 Feb 13:19:35

Skip events  
1

Search Controls

Markers

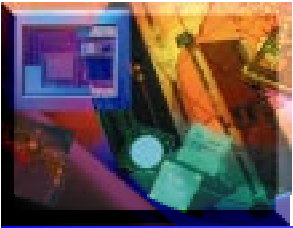
Tape Position and Usage

Message

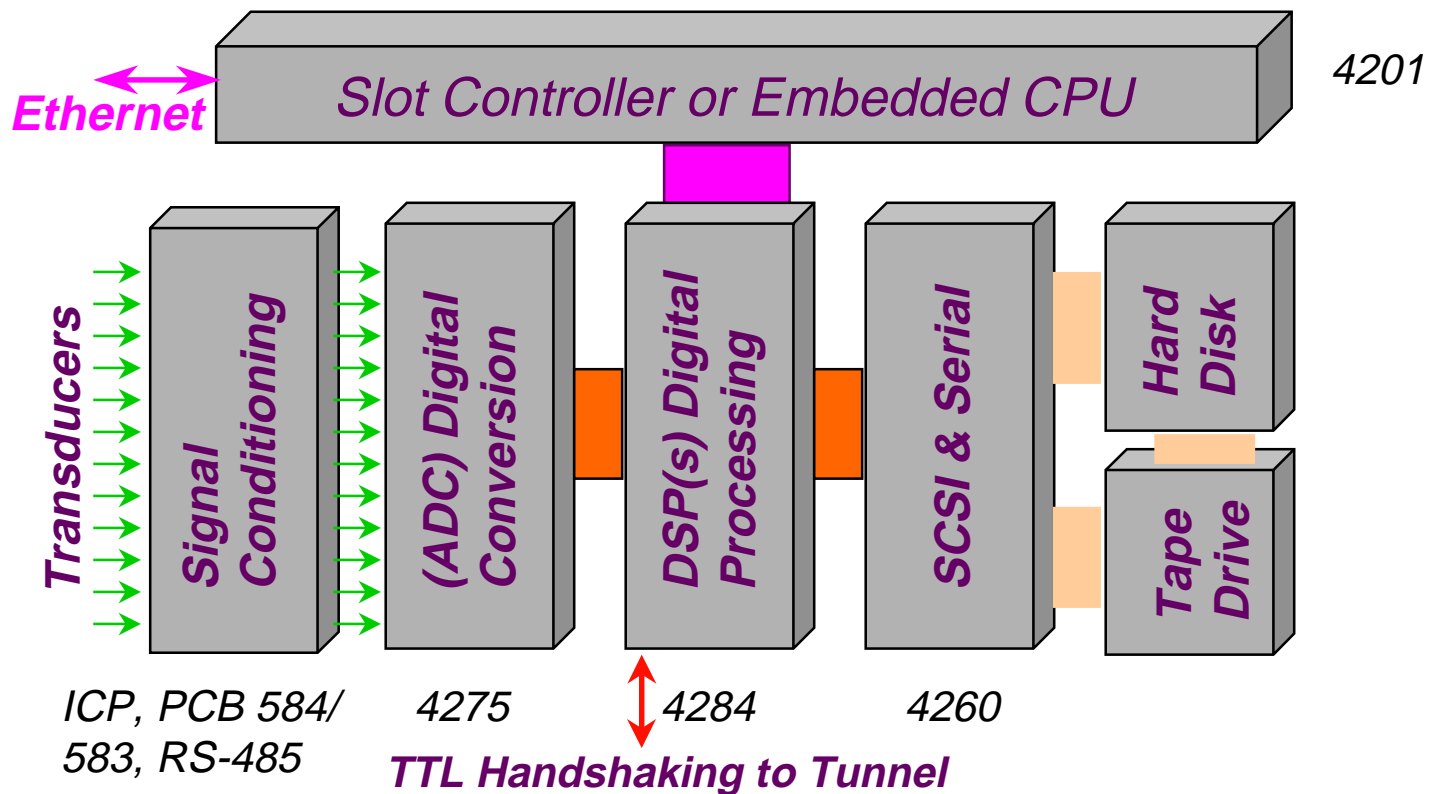
System Status

Directory of events, markers and messages





# Windtunnel 320 Chan. System



10 Modules for 320 Channels

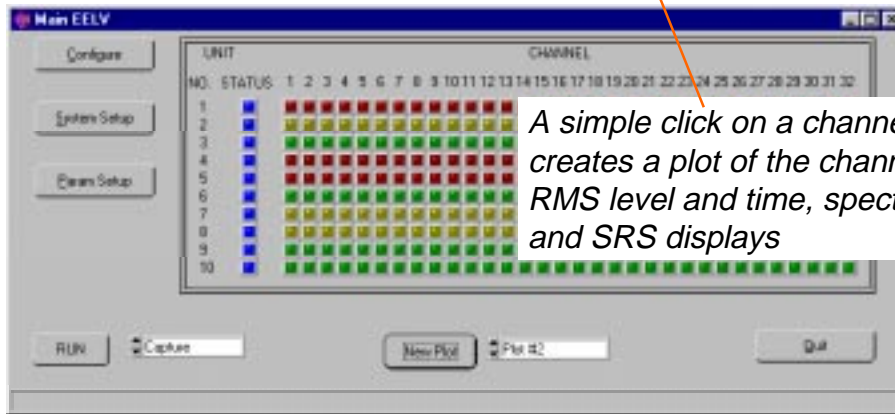
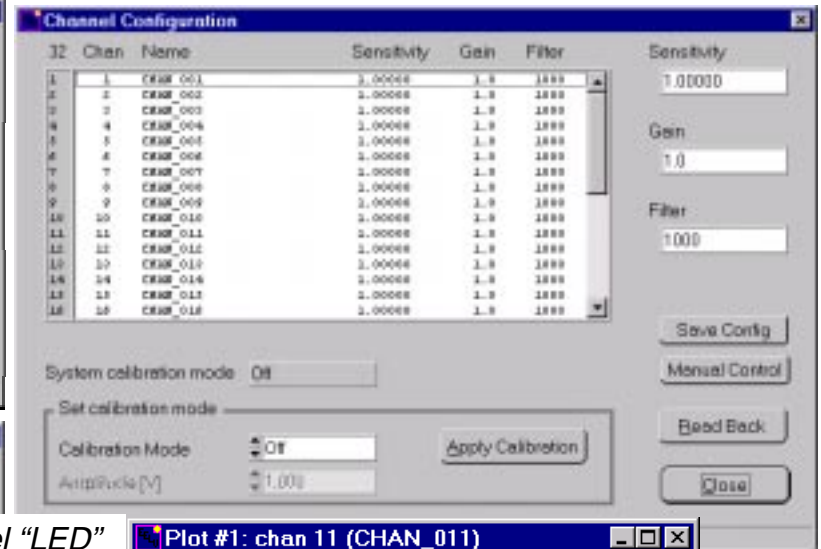
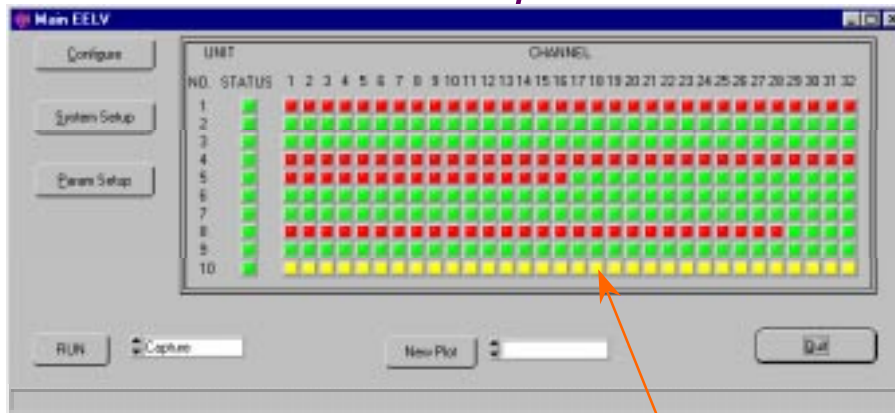




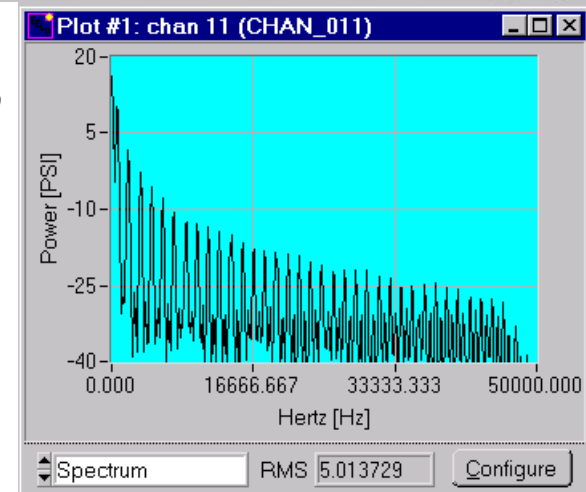


# Windtunnel System - Part 2

*A unique human interface was used to control, monitor and keep track of the 320 active channels:*

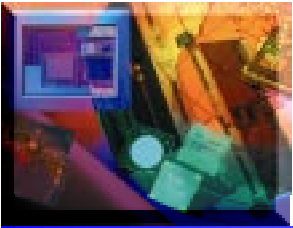


*A simple click on a channel "LED" creates a plot of the channel with RMS level and time, spectra, PSD and SRS displays*



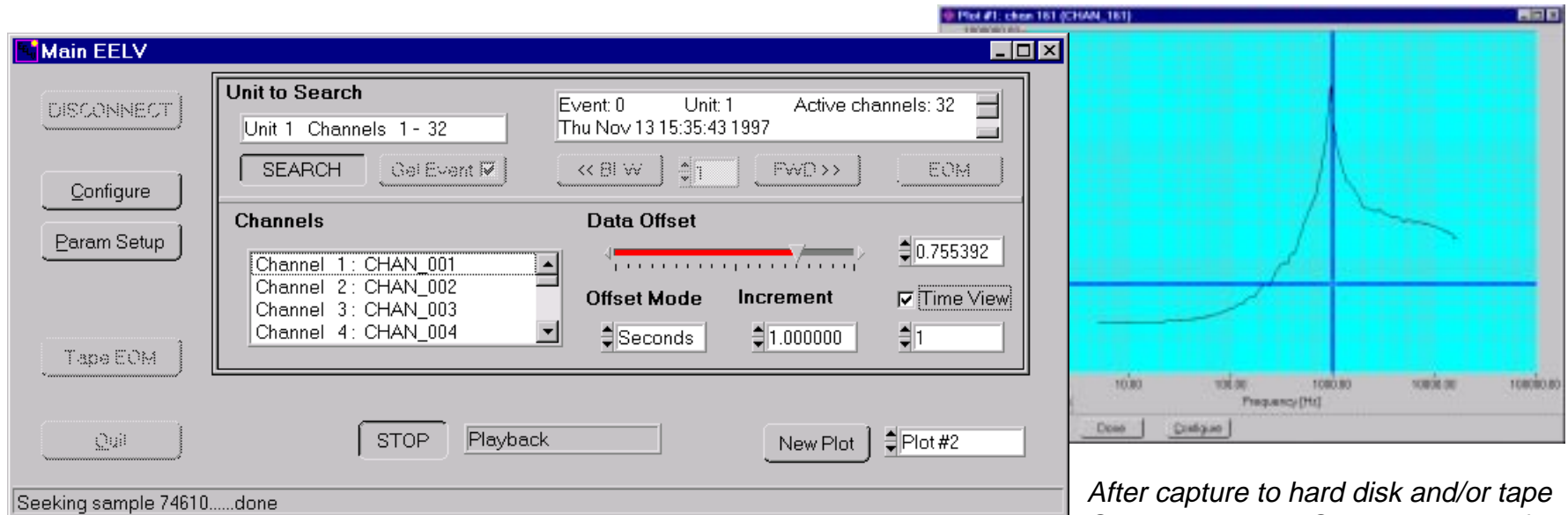
*Data captured to buffer (hard disk), loading to tape in progress alerts can be latched onto or used to stop loading.*



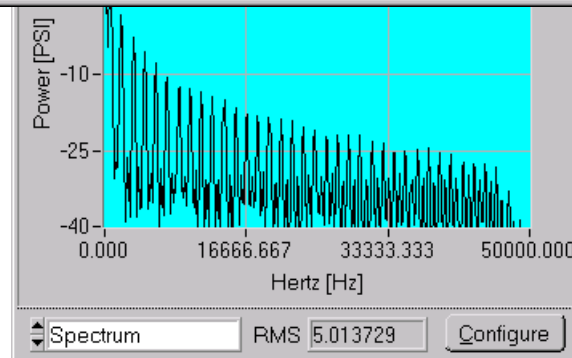


# System Evolution - Part 3

*After use in the tunnel - new missions required two @160 channel shock measurement and analysis systems*

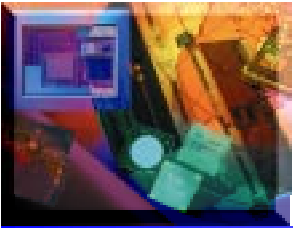


*Frequency and time plots available during playback*



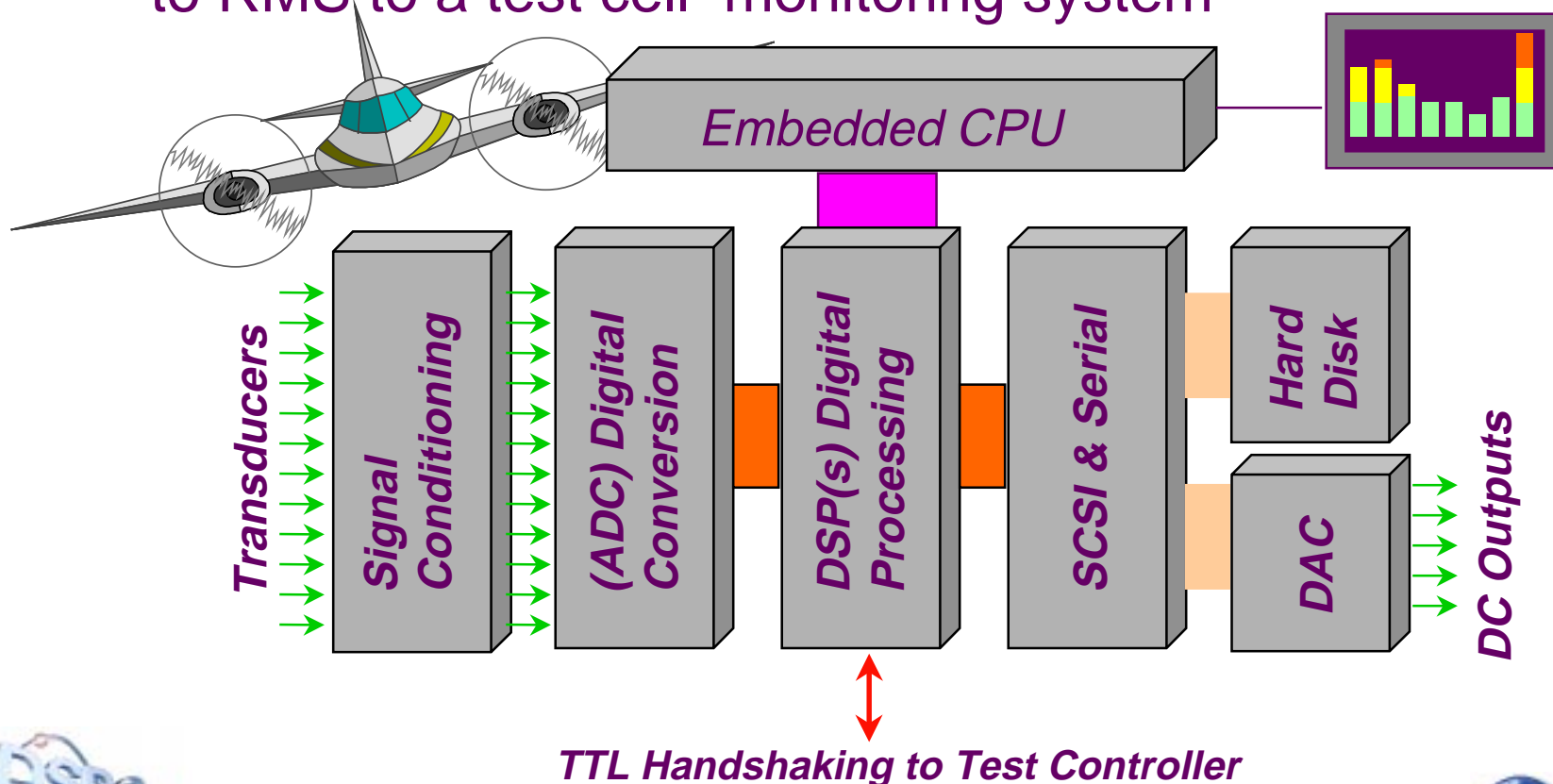
*After capture to hard disk and/or tape Shock Response Spectrum plots of a channel for a specific search point can be made with RMS level and time, spectra, PSD and SRS displays*





# Engine/Gearbox Vibration DATAQ

Receives vibration data from RS-232 controlled transducer conditioners and passes DC proportional to RMS to a test cell monitoring system





# VibMon - System Configuration

**Configuration Setup**

**Excel Setup**

Analog Input

Channel I.D.  Filter Low Pass

A/D Channel  Tracking B. Width

Name  Tracking Channel

Eng. Units  Tracking Mult.

Active  Warning Level

Gain  Warning Enable

Sensitivity  Alarm Level

Differentiation  Alarm Enable

Intergration

Analog Output

D/A Channel  Multiplier

Source I.D.  Output Offset

**System Setup**

Node Name  Sample Rate

Board Name  Record Time

Port Number  Pretrig Time

4260 StackPos  PSD Factor

4252 StackPos	A/D Unit	Mix Stack Pos
0.1	Unit 0	0
	Unit 1	1

SCSI Address	SCSI Disk	SCSI Address
0.1	Disk 0	0
	Disk 1	1

Buttons: Save, Quit, Change Password

Import control

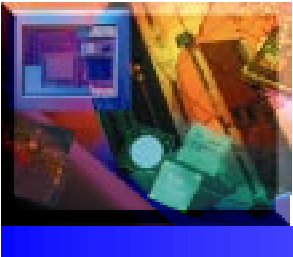
System control

Imported setup

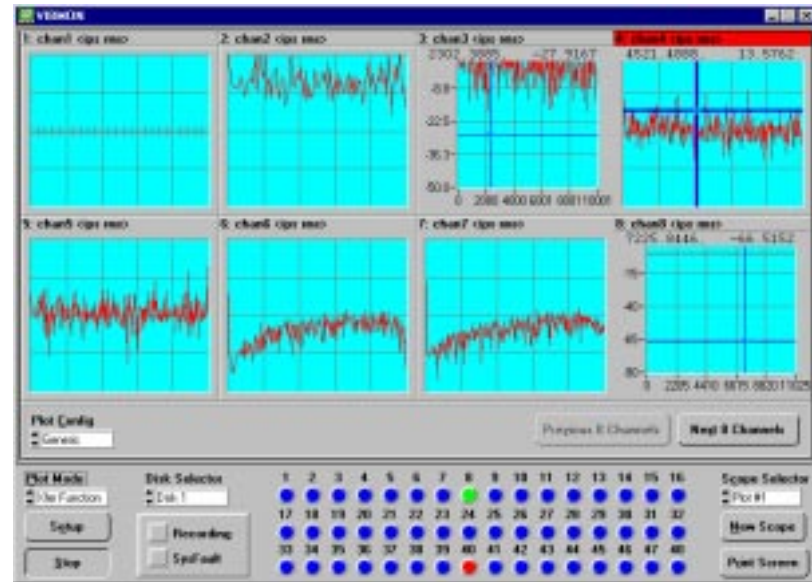
Setup: Default48 (48)

Id	Name	A/D	D/A	Units	Gain	Sens	Cond.	Filter	O-gain	O-offset	Warning	Alarm	
1	chan1	01	16	ips	0.0	1.00e+000	None	Low	1000.0	1.00e+000	0.00e+000	4.00	4.50
2	chan2	02	15	ips	0.0	1.00e+000	None	Low	2000.0	1.00e+000	0.00e+000	4.00	4.50
3	chan3	03	14	ips	0.0	1.00e+000	None	Low	3000.0	1.00e+000	0.00e+000	4.00	4.50
4	chan4	04	13	ips	0.0	1.00e+000	None	Low	4000.0	1.00e+000	0.00e+000	4.00	4.50
5	chan5	05	12	ips	0.0	1.00e+000	None	Low	5000.0	1.00e+000	0.00e+000	4.00	4.50
6	chan6	06	11	ips	0.0	1.00e+000	None	Low	6000.0	1.00e+000	0.00e+000	4.00	4.50
7	chan7	07	10	ips	0.0	1.00e+000	None	Low	7000.0	1.00e+000	0.00e+000	4.00	4.50





# VibMon - GUI/HMI for DATAQ



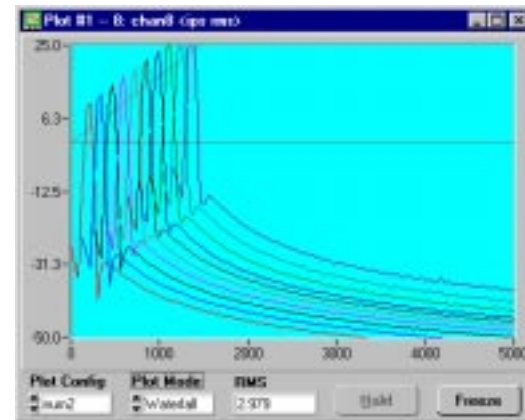
VIBMON

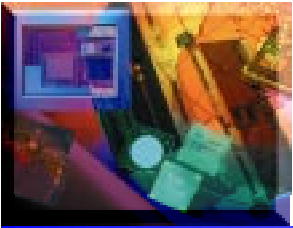
Disk 1 Disk Directory

File Name	Date	Time	Size	Attributes
DATA	31	Mar 98	13 53	45551 Default40 1 0
DATA	31	Mar 98	15 22	21378 Default40 3 0
DATA	02	Apr 98	14 34	298 Default40 6 0
DATA	02	Apr 98	13 29	65533 Default40 7 0
DATA	02	Apr 98	14 26	697 Default40 8 0
DATA	02	Apr 98	14 26	84 Default40 9 0
DATA	02	Apr 98	14 26	128 Default40 10 0
DATA	02	Apr 98	14 28	6251 Default40 11 0
DATA	02	Apr 98	14 34	154 Default40 12 0
DATA	02	Apr 98	14 35	65534 Default40 13 0
SNAP	31	Mar 98	13 41	268 Default40 0 1
SNAP	03	Apr 98	10 34	216 Default40 13 1

Buttons: Capture, Extract, Analyze, Quit

Label: Capturing





# VibMon - Plot Configuration

**Generic**

Name:

**Time Domain**

Min Scale	Max Scale	Time Base
<input type="text" value="-1.000E+0"/>	<input type="text" value="1.000E+0"/>	<input type="text" value="22.000E-3"/>

**Frequency Domain**

Min Scale	Max Scale	Min Freq	Max Freq
<input type="text" value="-50.000E+0"/>	<input type="text" value="10.000E+0"/>	<input type="text" value="0.000E+0"/>	<input type="text" value="5.000E+3"/>

**Nth Octave**

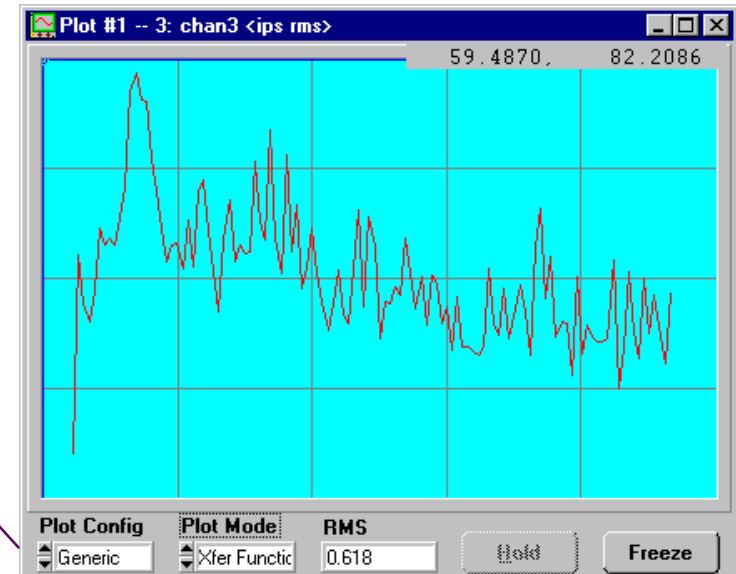
Start Frequency	Number of Octave	Div. per Octave
<input type="text" value="10.00"/>	<input type="text" value="5"/>	<input type="text" value="3"/>

**Transfer Function**

Reference Channel
<input type="text" value="1"/>

**Water Fall**

View Angle	View Raise	Trace Separation	Number of Traces	Update Period
<input type="text" value="11.000E+0"/>	<input type="text" value="5.000E+0"/>	<input type="text" value="1.10"/>	<input type="text" value="10"/>	<input type="text" value="100.000E-3"/>



Plot type





# Summary

- GUI has evolved into HMI
- Elaborate systems with simple operation are possible
- GUI/HMI “strawmen” are invaluable for development and evaluation
- Consistent HMI’s can cover a wide variety of hardware and data types

