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

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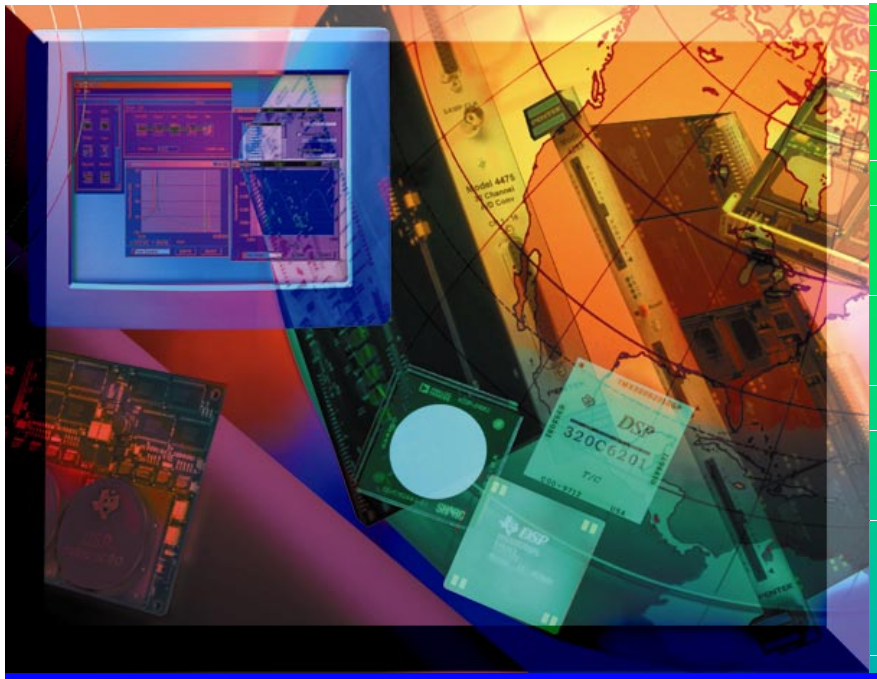
THIC Meeting at Hotel Villa
San Mateo CA 94403-4537
July 22, 1998



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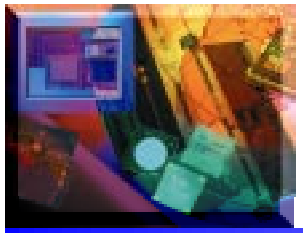
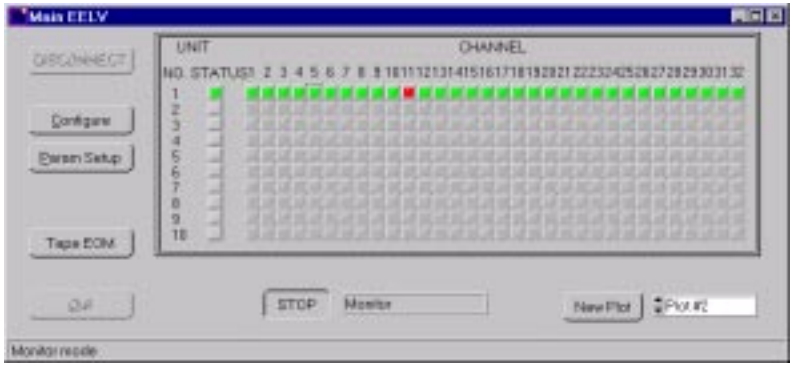
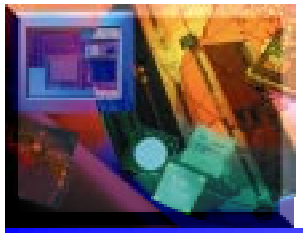


The Tasks at Hand:

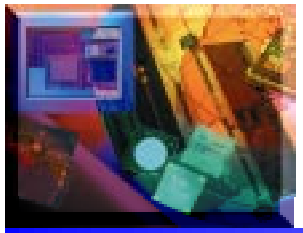
- GUI or HMI?
  - Human Machine Interface
- Control without complexity
- Acquisition of valid data
- Monitoring without confusion
  - Real-time vs.
    Visual Real-time
- Expansion without constraints
- Cost & Development Time vs. COTS





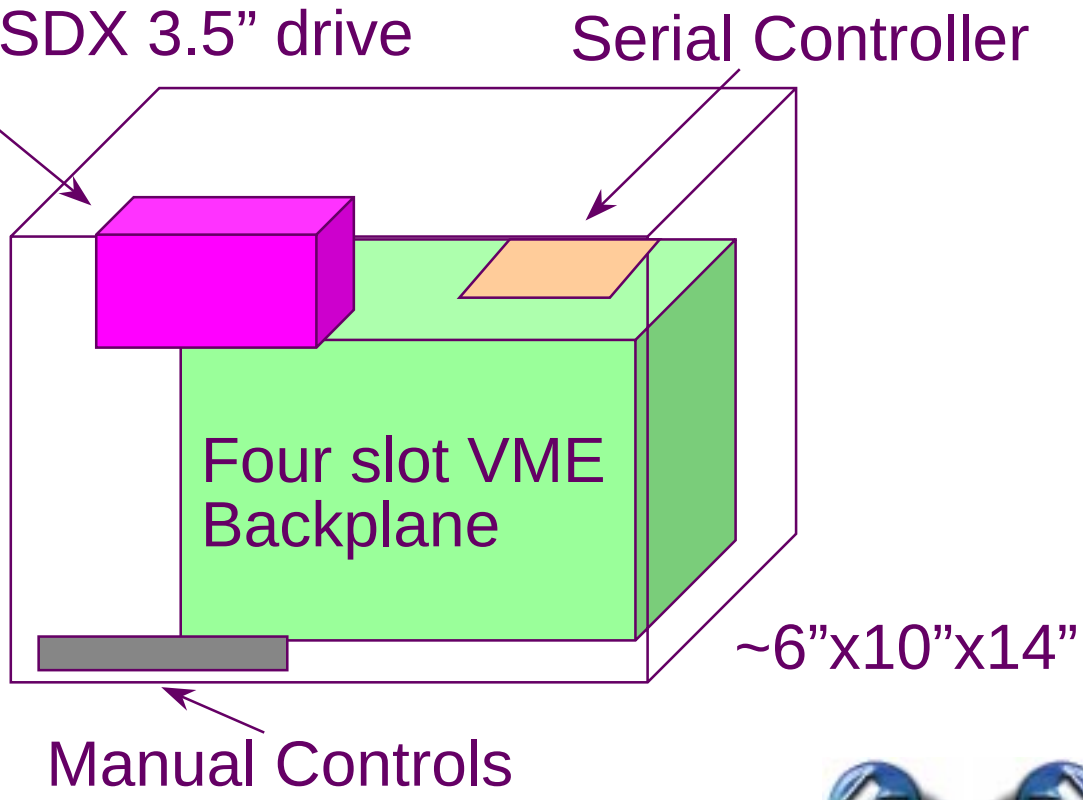
Four HMI/GUI Examples

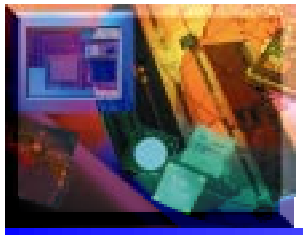
- Multi-purpose ruggedized recorder
  - No GUI, LCD remote control
- Serial (PCM) sonar recorder
  - Simple GUI to match past
- Windtunnel DATAQ
  - 320 channels - simple functionality
- Vibration monitoring, processing and acquisition system
  - 32 channels - complex functionality



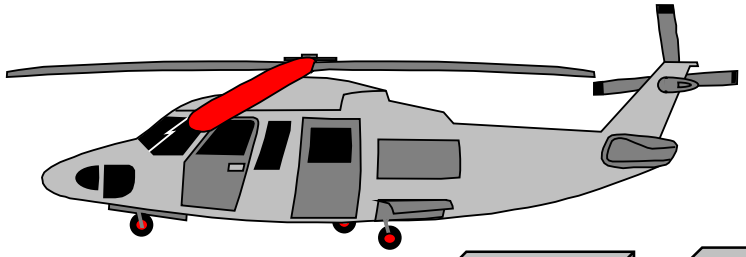
PE DCMR-24 Digital Recorder

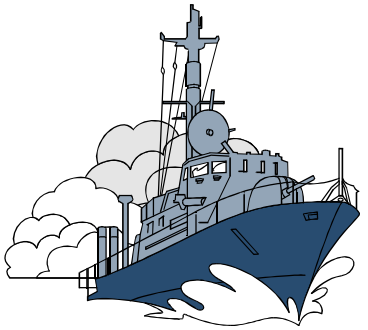
24 Mbit/s with 25 GByte uncompressed capacity
uses SONY's AIT tape, 28 VDC supply
16-32 Ch. Analog, 2 Ch. Video, Serial and/or 1553

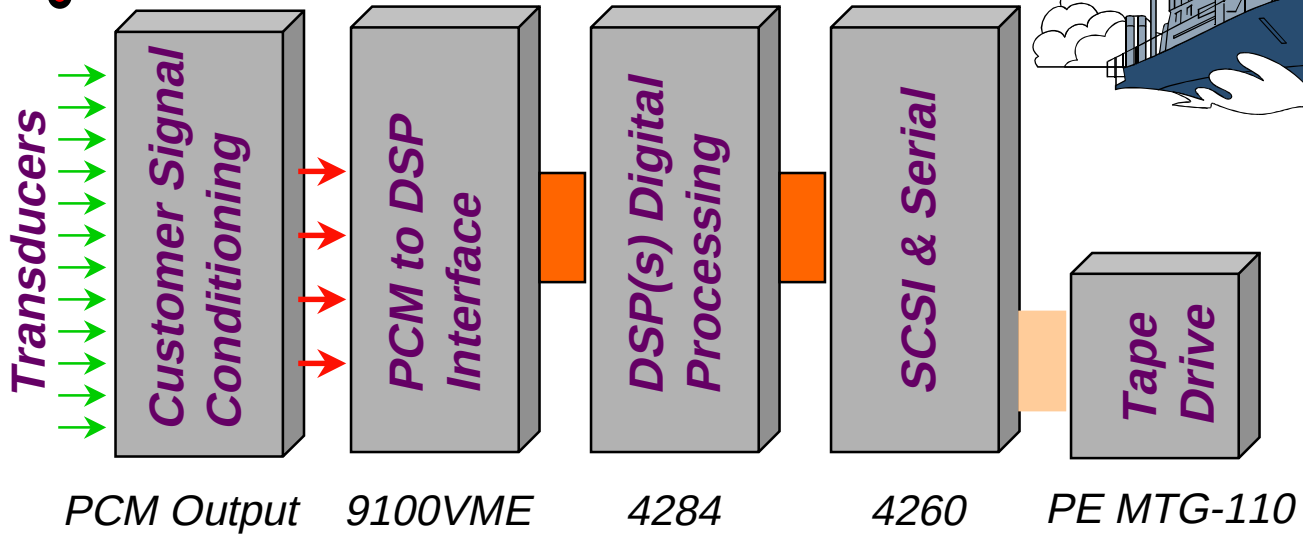


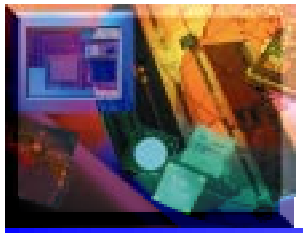


Ocean Floor SONAR Mapper

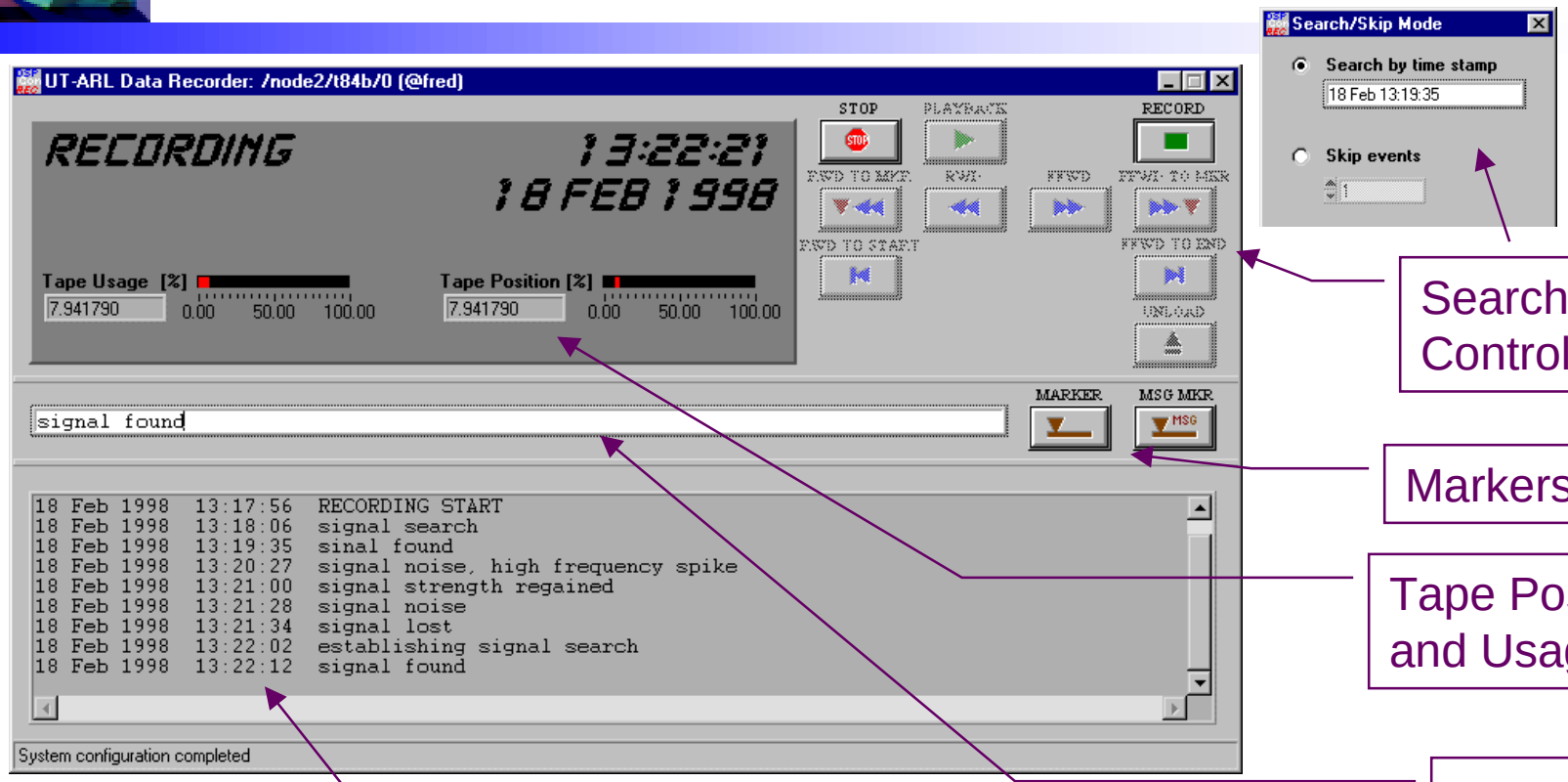








Ocean Floor SONAR Mapper GUI



Search Controls

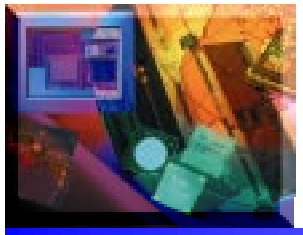
Markers

Tape Position and Usage

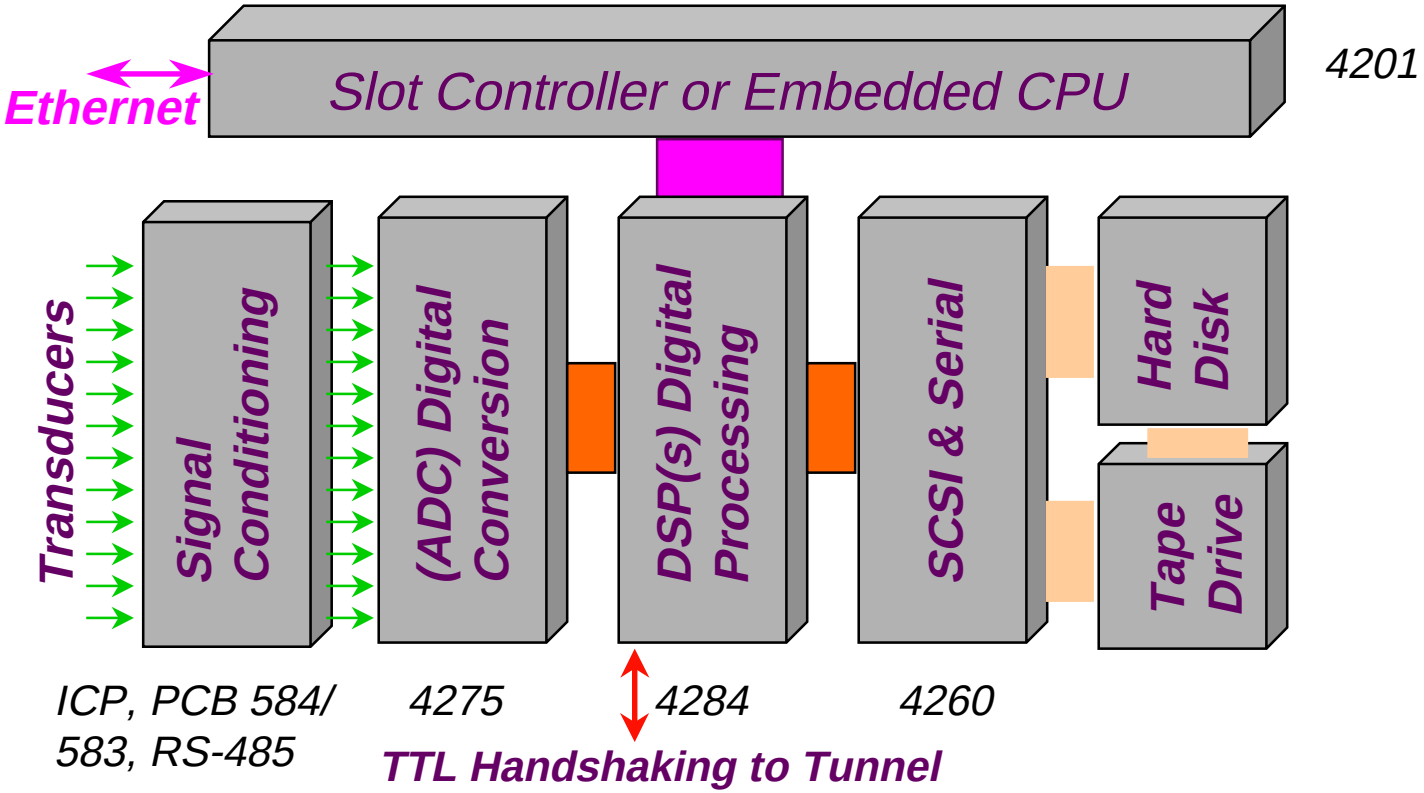
Message

Directory of events, markers and messages

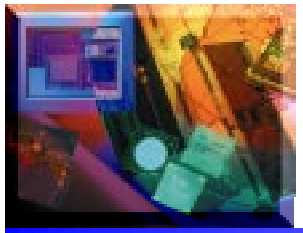
System Status



Windtunnel 320 Chan. System

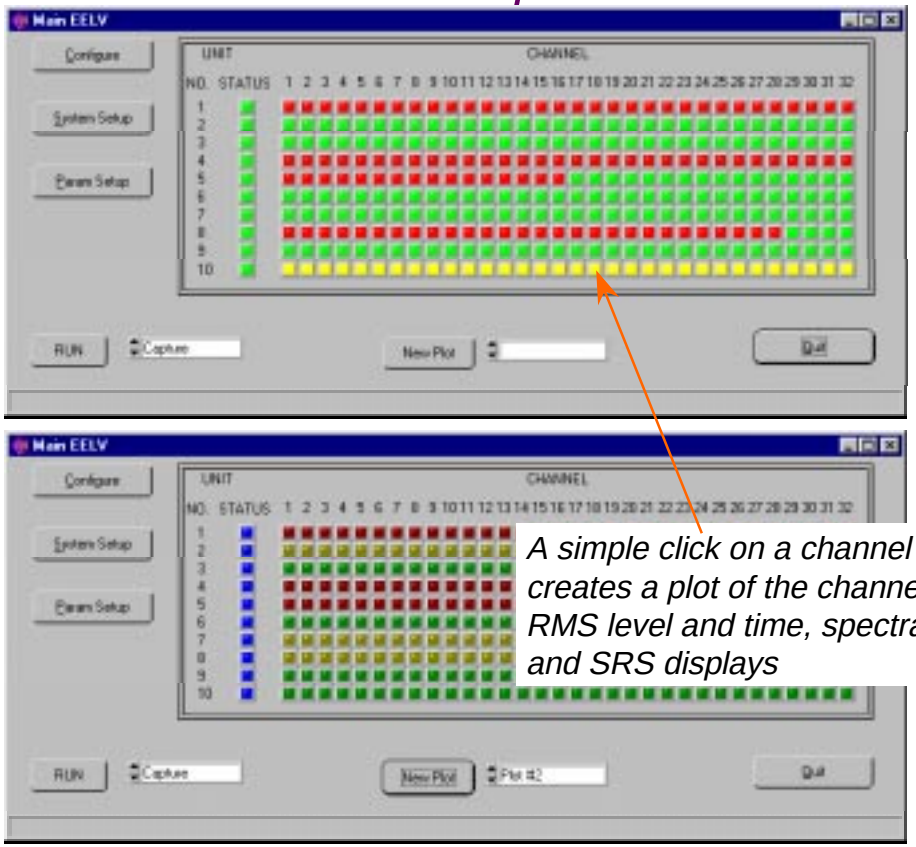


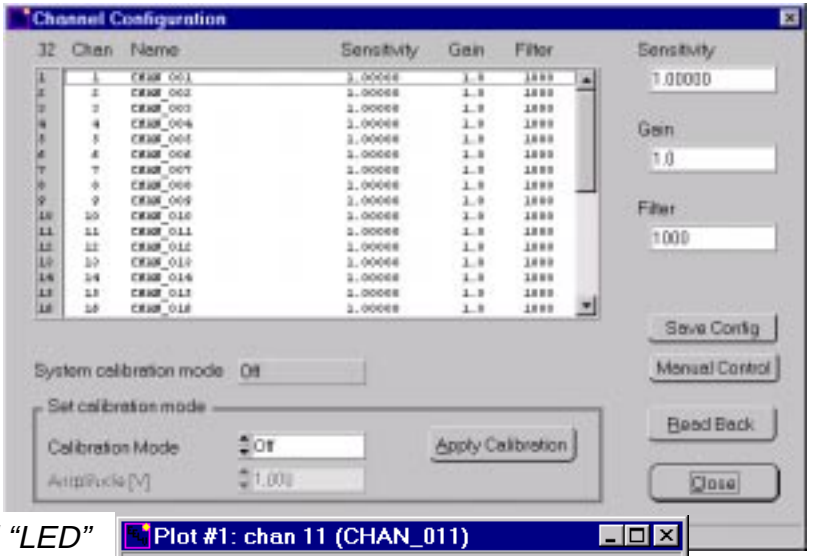
10 Modules for 320 Channels



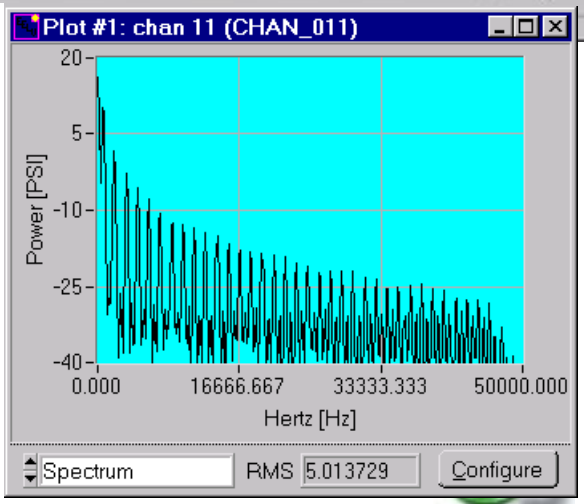
Windtunnel System - Part 2

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

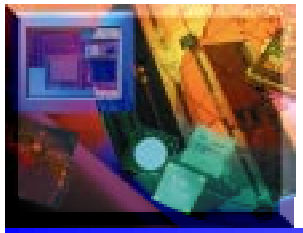




A simple click on a channel "LED" creates a plot of the channel with RMS level and time, spectra, PSD and SRS displays

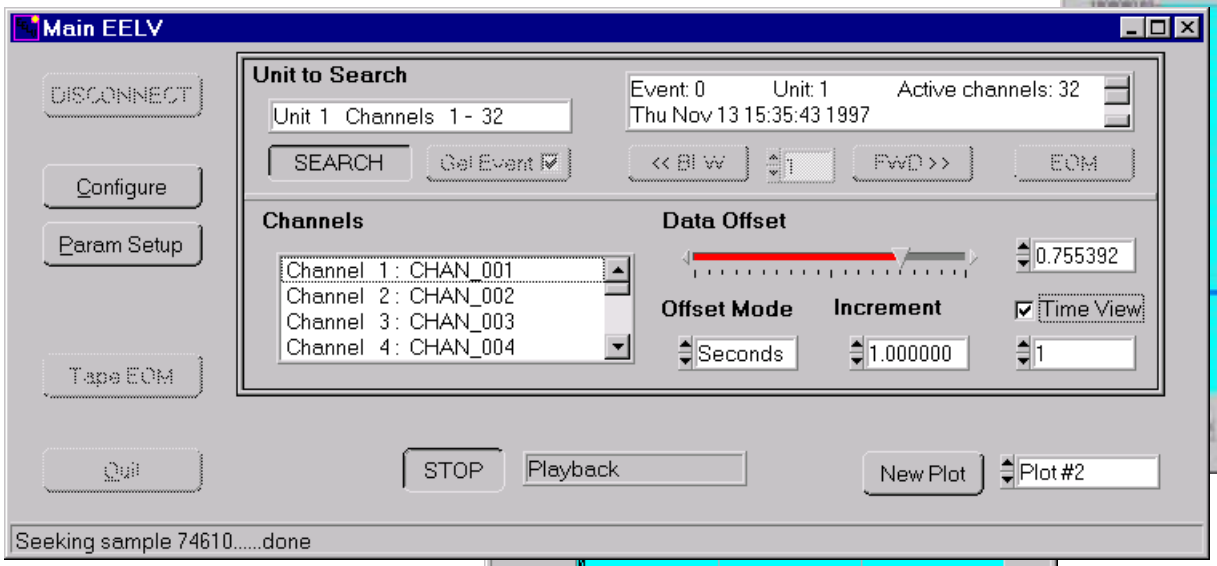


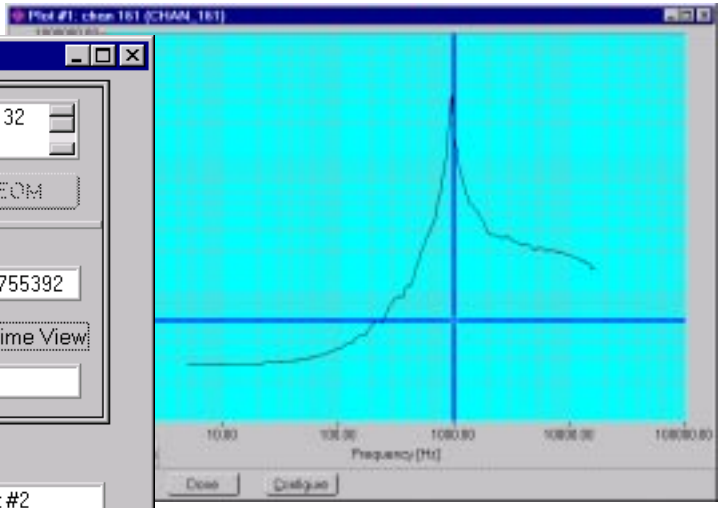
Data captured to buffer (hard disk), loading to tape in progress alerts can be latched onto or used to stop loading.



System Evolution - Part 3

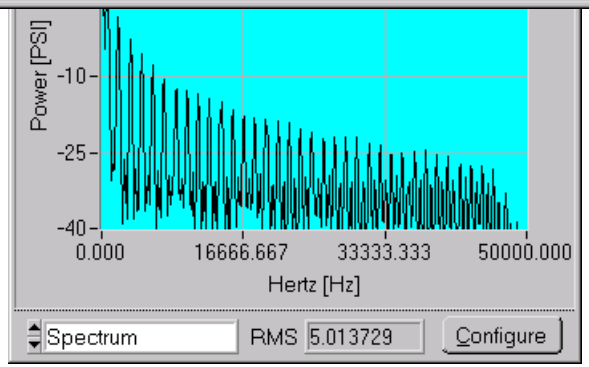
After use in the tunnel - new missions required two @160 channel shock measurement and analysis systems

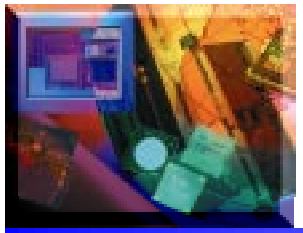




After capture to hard disk and/or tape Shock Response Spectrum plots of a channel for a specific search point can be made with RMS level and time, spectra, PSD and SRS displays

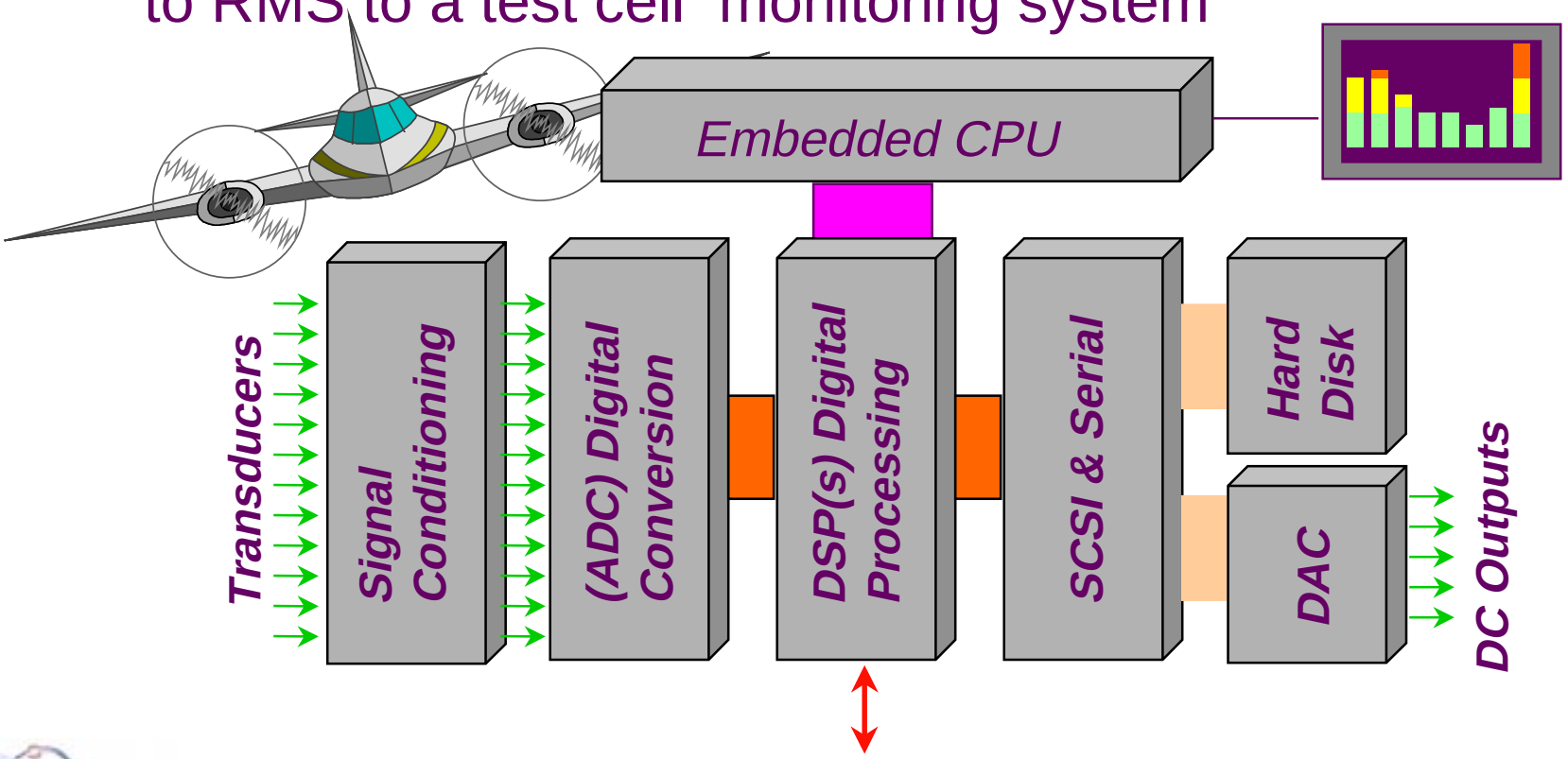
Frequency and time plots available during playback

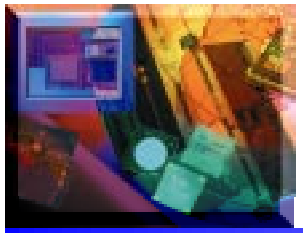




Engine/Gearbox Vibration DATAQ

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.	A	Filter Low Pass	O
A/D Channel	B	Tracking B. Width	P
Name	C	Tracking Channel	Q
Eng. Units	D	Tracking Mult.	R
Active	F	Warning Level	S
Gain	J	Warning Enable	T
Sensitivity	K	Alarm Level	U
Differentiation	N	Alarm Enable	V
Intergration	M		

Analog Output

D/A Channel	B	Multiplier	D
Source I.D.	C	Output Offset	E

System Setup

Node Name	jmniet.dund	Sample Rate	16000.00
Board Name	t85	Record Time	10.00
Port Number	8000	Pretrig Time	2.00
4260 StackPos	2	PSD Factor	0.8000

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

Save | Quit | Change Password

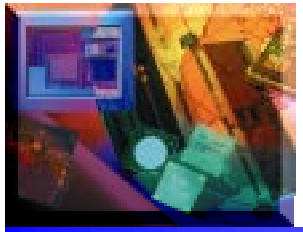
Import control

System control

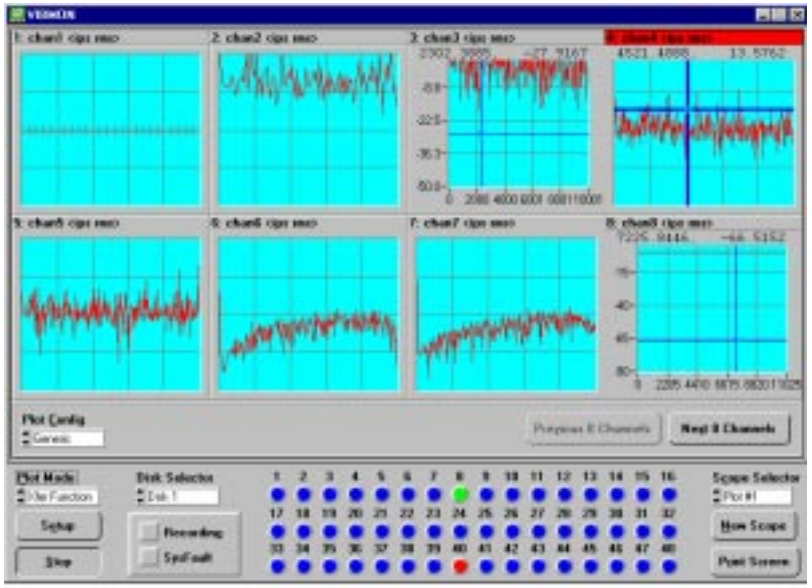
Imported setup

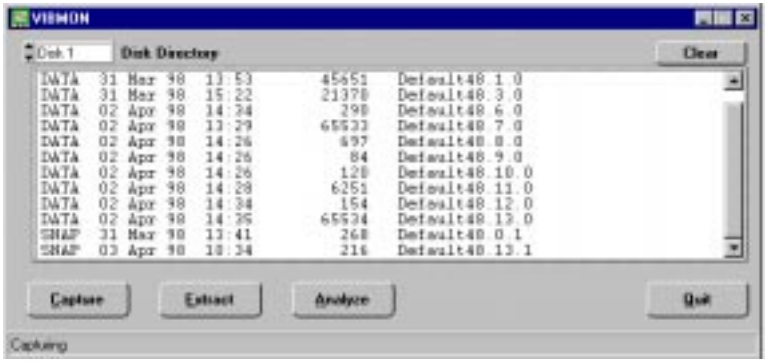
Setup: Default48 (48)

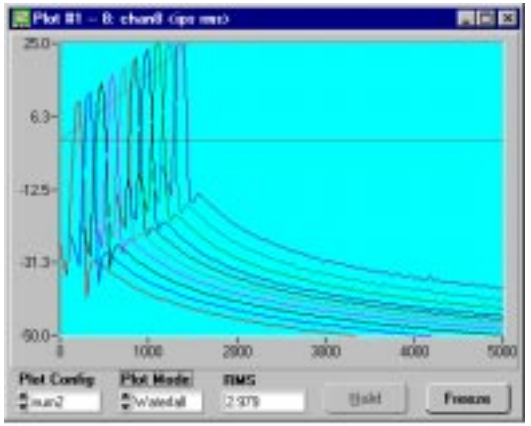
Id	Name	A/D	D/A	Units	Gain	Sens	Cond.	Filter		O-gain	O-offset	Warning	Alarm
1	chan1	01	16	ips	0.0	1.00e+000	None	Low	1000.0	1.00e+000	0.00e+000	4.00	4.50
2	chan2	02	15	ips	0.0	1.00e+000	None	Low	2000.0	1.00e+000	0.00e+000	4.00	4.50
3	chan3	03	14	ips	0.0	1.00e+000	None	Low	3000.0	1.00e+000	0.00e+000	4.00	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

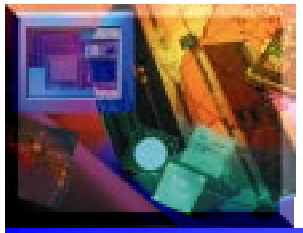


VibMon - GUI/HMI for DATAQ

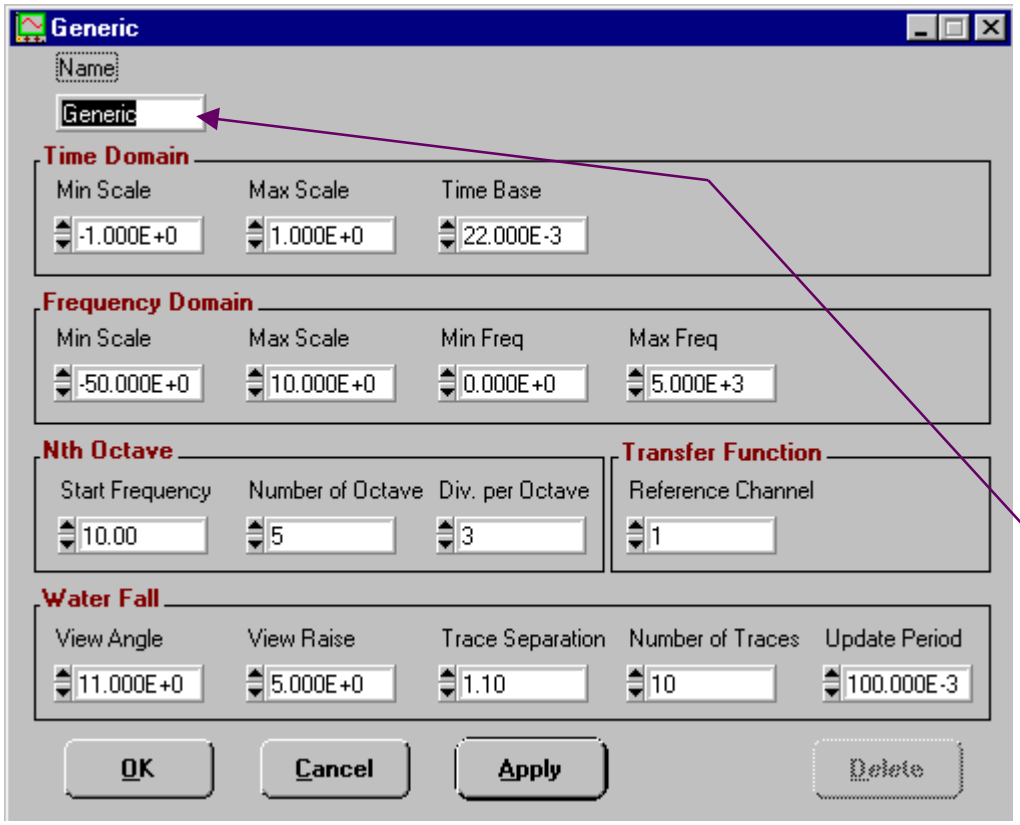


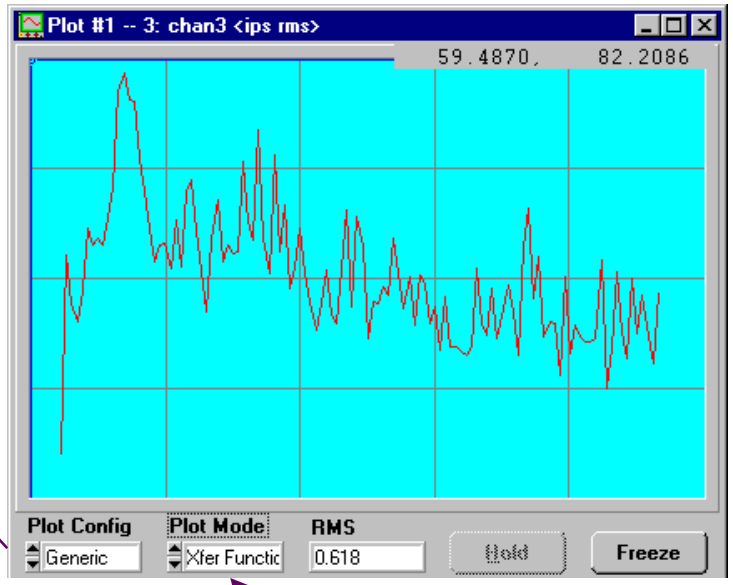




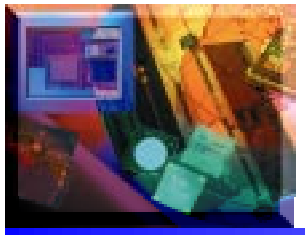


VibMon - Plot Configuration





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