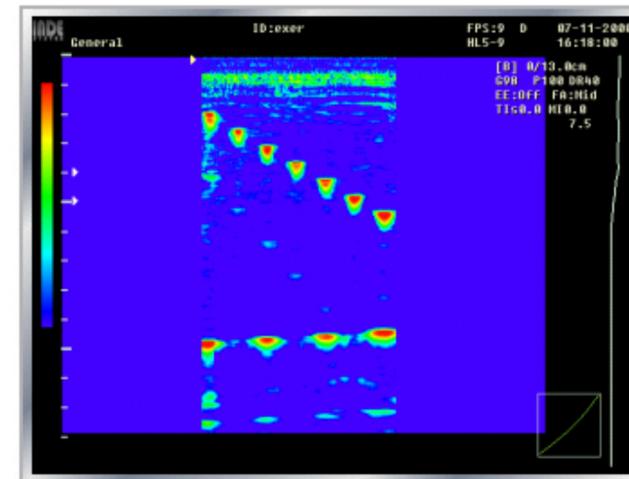


# Innovative Non-Destructive Inspection System

# PAULI

**Phased Array Ultrasonic Inspection**

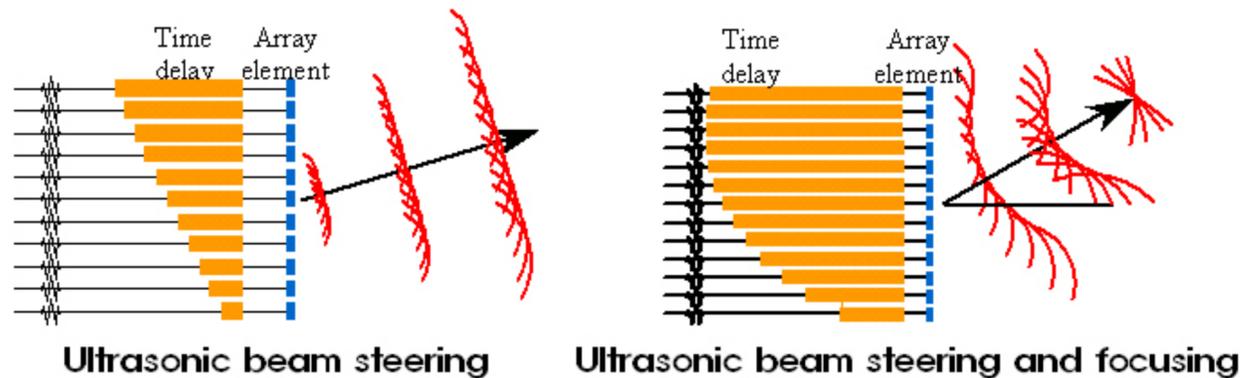
- ⊕ **Real time images of inside of specimens**
- ⊕ **Control of beam angle and focal depth by an electronically controlled array transducer**
- ⊕ **Real time RF signals for the selected beam angle**
- ⊕ **Database[INDE View] and video connection**
- ⊕ **Cine display of hundred successive images**



# INDE SYSTEM

## Control of ultrasonic beam by phased array technique

PAULI uses phase array technique that allows the electronic control of ultrasonic radiation beam from an multi-element array transducer. PAULI controls ultrasonic excitation time of each element in an array transducer by software. And the superposition of the each ultrasonic wave from the individual element forms a new wave front. Therefore, ultrasonic beam is steered and focused at desired area within steering range without using focusing lens and angled wedges. Also the sensitivity at focal area is increased and the noise from unfocused area is decreased.

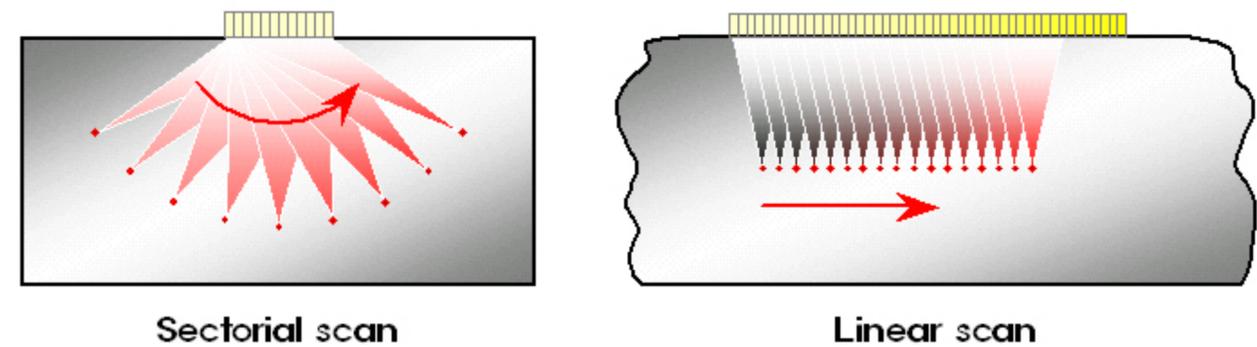


## Real time images of inside of test piece

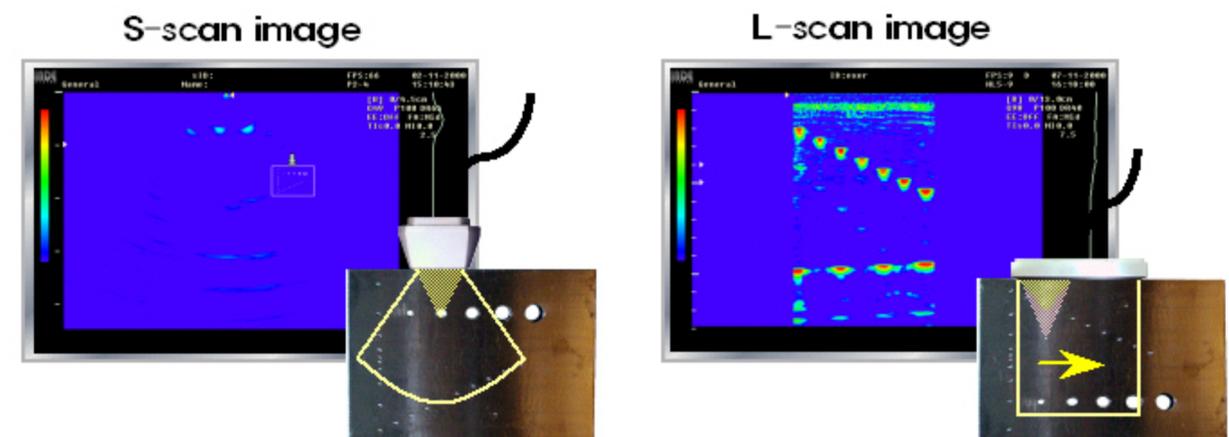
PAULI can scan focused ultrasonic beam very rapidly to make two-dimensional images of the inside of a test piece in real time. Within scan area of an array transducer, high quality B-scan image is obtained at once without any moving mechanism. The image updates instantly the parameter and transducer position change. Depending on the inspection conditions, linear scan (L-scan) and sectorial scan (S-scan) can be selected. Through the image, the intuitive detection and location of flaws are possible.

## Fundamentals of ultrasonic beam scan electronically

Resulting images can be represented as sectorial and linear images. When the transducer contact (accessible) area on the surface of the test piece is limited, S-scan can be used to make the large sectorial shape B-scan image of the inside of the test piece. When the accessible area is enough to contact the linear array transducer, L-scan can be used to make enhanced images. These scan is totally controlled by software and mechanical instrument is not necessary for the scan area determined by the array transducer.

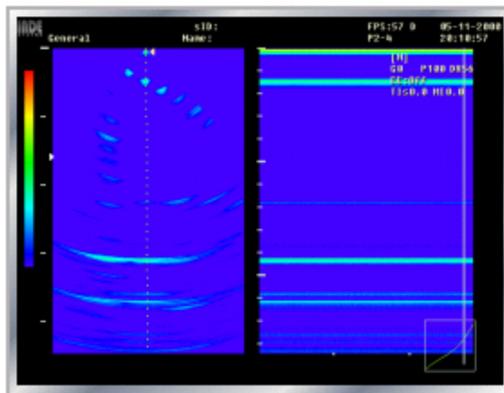


- delectability : below 0.3 mm flaw
- resolution : below 2mm
- Time Gain Compensation
- Zone Based Transmit Focusing
- Dynamic Aperture
- Dynamic Receive Focusing
- Image Control



## CINE and Transient Scan

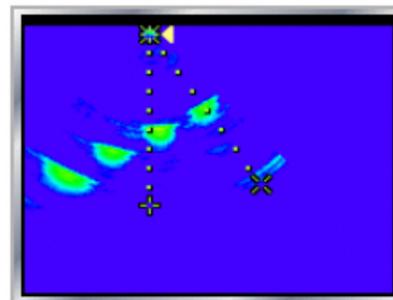
In S-scan or L-scan, PAULI always saves very recent 128 successive images in temporary memory and redisplay the images successively or manually in system pause status, which is so called CINE. CINE functions like video player. Therefore, it is really easy to review very recent images. Transient scan displays the time history of a selected scan line in the image.



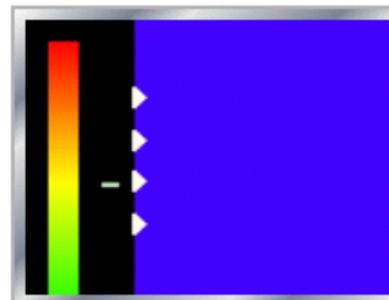
## Convenient functions

- ⊞ Focal depth control
- ⊞ Sizing
- ⊞ Angle measurements
- ⊞ Area measurements
- ⊞ Test piece information

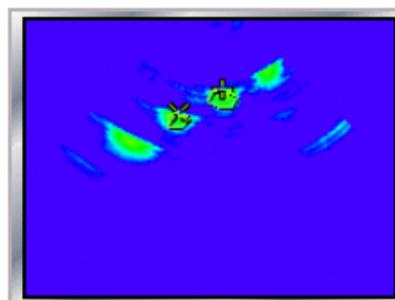
angle measurement



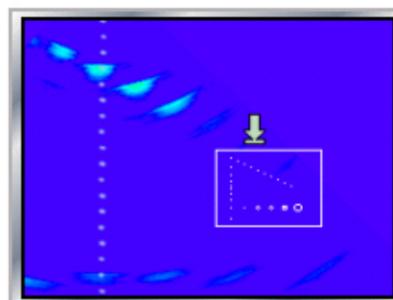
focal depth control



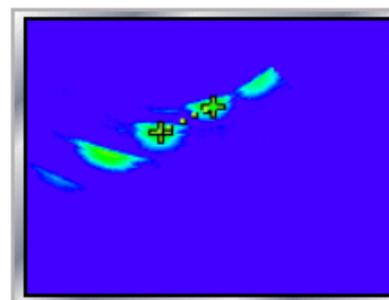
area measurement



information of test piece

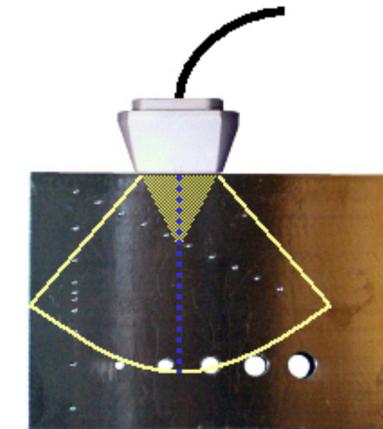
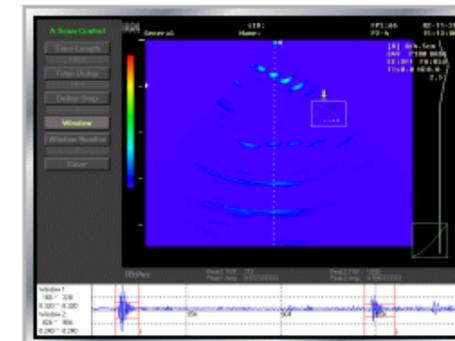


sizing



## Provide A-Scan signals for desired beam angle

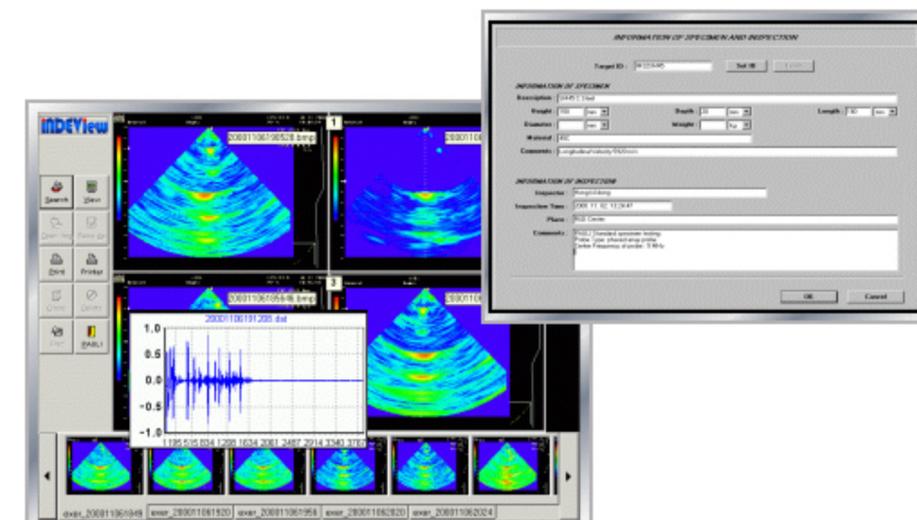
PAULI provides A-scan signals synchronized with scan images. To obtain A-scan signals at different incident angles, simply change the scan line selection by using mouse in S-scan. This is great advantage over the conventional ultrasonic testing.



- Sampling Rate : 20 Ms/s
- Time Gate and Threshold
- Automatic Peak Detection

## Data viewer-INDE View

The inspection results are digital images and A-scan signals. The results are saved by one-touch button. The saved data can be recalled and displayed in specialized software, INDE View. INDE View can contain all the information that inspectors want.



## Convenient user interface

PAULI has easy to used GUI interface controlled by mouse, keyboard, buttons, and knobs. The one-touch buttons for the selection and control will make easy operation of the PAULI. Especially, gain knob, TGC slider, focal depth change button, sizing button, saving button will increase the efficiency of the system operation.



## Multimedia connection

PAULI could connect with TV monitor and display S-scan, L-scan, and transient scan images. Therefore, it could record by video tape through video player. Also PAULI has LAN connection so that saved data can be download easily.

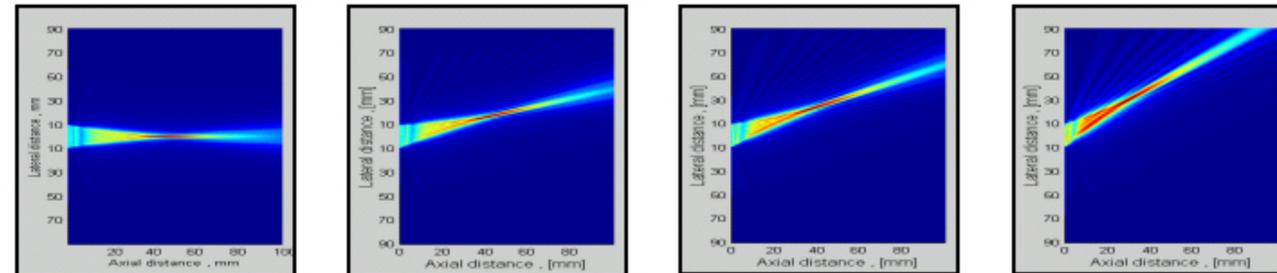
- video in and out
- print out
- external monitor out
- LAN



## Phased array transducers

Multi-element array transducer is the one of the essential accessory to obtain the images. Therefore, the ultrasonic radiation beam field has been calculated exactly by Boundary Diffraction Wave Model. INDE system has capability to design and fabricate multi-element linear and phased array transducers including custom specification.1

### Ultrasonic radiation beam simulation



### Features

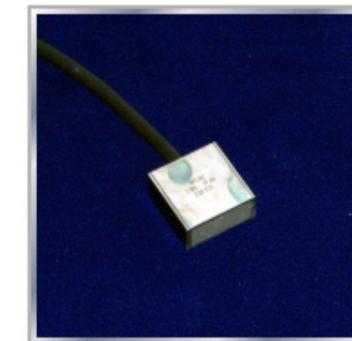
- Automatic transducer identification
- Frequency range: 1~10 MHz
- Number of elements : 8,16,32,64,128

### Options

- Custom design of transducer
- Custom wiring



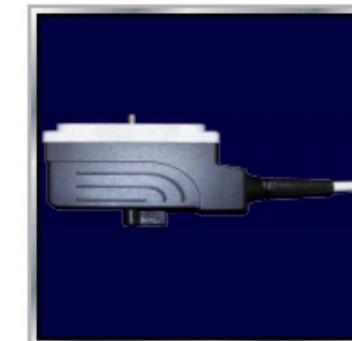
S-scan array probe  
Type I



S-scan array probe  
Type II



L-scan array probe



Connector to system

## Specifications

<b>Product Name</b>	<b>PAULI</b>
Image Resolution	640 × 480 pixels
View Angle	Upto 90 ° for S-scan
Frequency Range	1 to 10MHz, depend on probes
Acoustic Power control	40% to 100%, step by 10%
Channel	64 independent channels
Focal points	Simultaneous selective transmit focal points
Focusing	Digital Beamforming
Sampling Rate	20MHz
Gain	Dynamic Range : 96dB
Aperture	Dynamic Aperture
Probe(Optional)	Phase array : up to 64 elements Linear array : up to 128 elements Center Frequency : 5 MHz, 7.5MHz (custom order)
User Input	Keypad Keyboard Trackball Mouse
System Output	Monitor : 13.3" TFT LCD Type Printer Port External : VHS/SVHS Output Port Network : 10-base T(TCP/IP)
Storage	Hard Disk Drive (Default)
Power	Input : 100 ~ 120Vac, 12.5A/200 ~ 240Vac, 6.3A Power Consumption 390W without any accessory External power
Dimensions(D×W×H)	622×510×582 mm
Weight	99 kg

# INDE SYSTEM

**Innovative Non-Destructive Evaluation System**

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