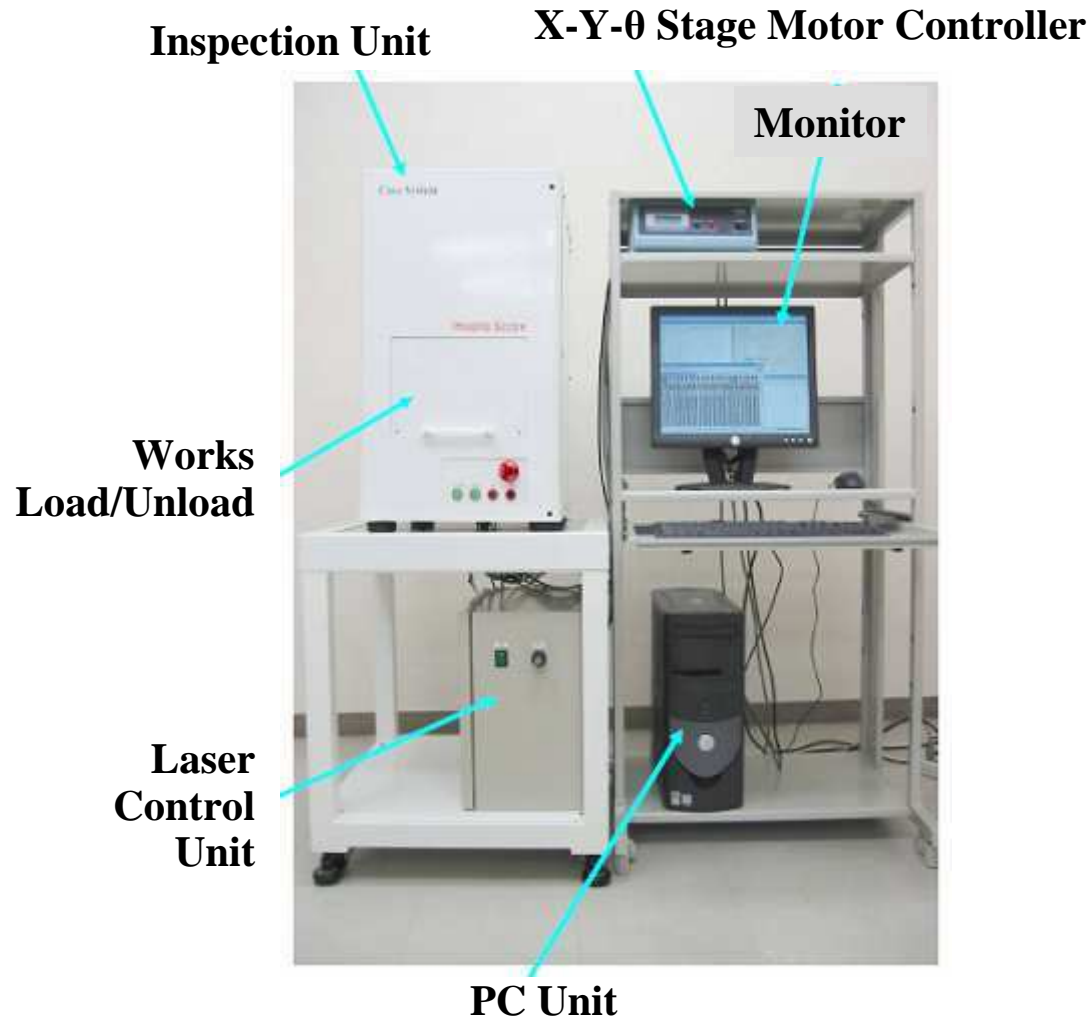


# CORE SYSTEM – LASER IMAGE PROFILER



< *SCANNING LASER IMAGE PROFILER* >



**CSM-Series  
System  
Configurations**

# CORE SYSTEM – LASER IMAGE PROFILER

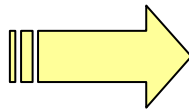


## *SCANNING LASER IMAGE PROFILER*

### *-- Applications Advantages*

**Wider Area of Surface Distortion Inspection at **Nano Level**  
with CORE patented Scanning Laser Technology**

Hard Disk  
Semiconductor Wafer  
LCD • FPD Panel  
ITO Film  
Electronics Components  
Optical Components  
Precision Parts

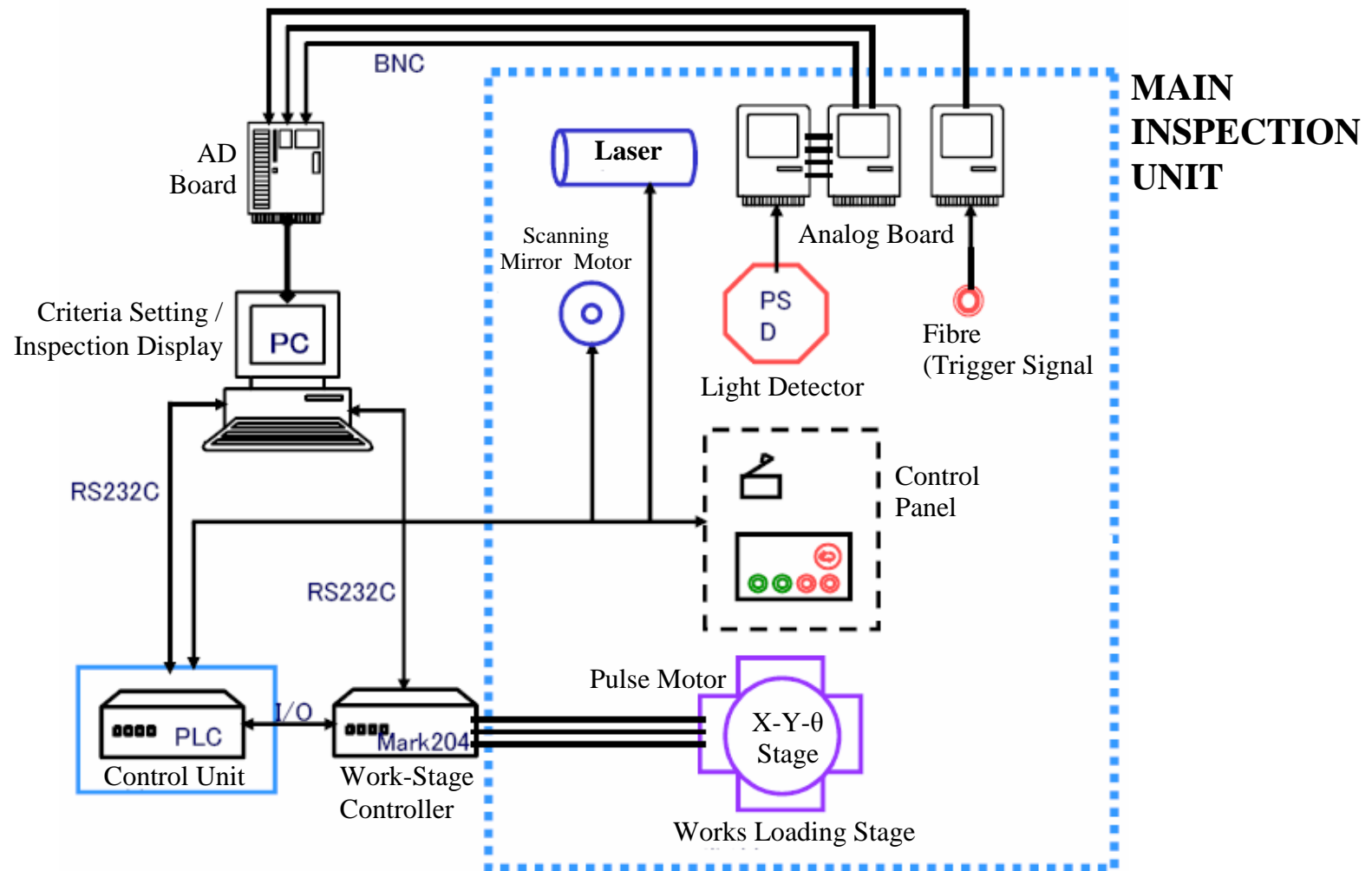


Surface Distortion: Roughness, Distortion  
Surface Defects: Scratches, Dirt  
Surface Foreign Particles: Dust Particles,  
Laminated mask/film surface distortion  
etc.. detect by superb high resolution

**Digital Data &  
3D Image Display**

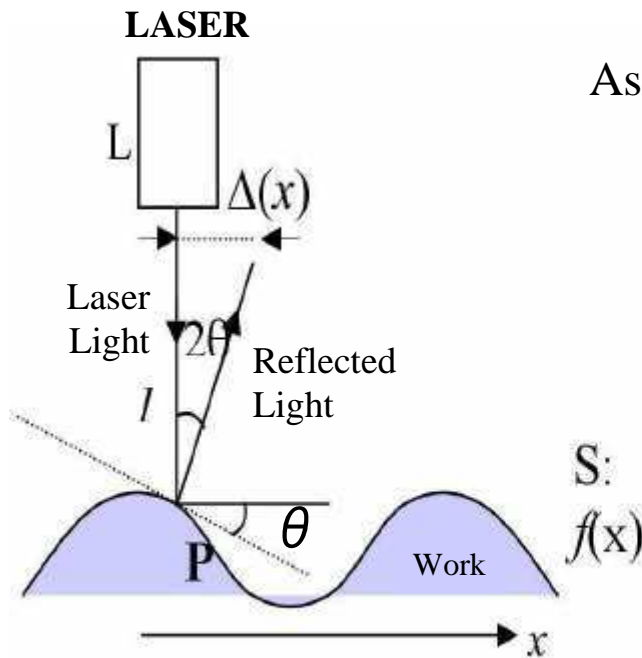
# CORE SYSTEM – LASER IMAGE PROFILER

## CSM-Series System Configurations



# CORE SYSTEM – LASER IMAGE PROFILER

## Basic Working Principle



Assumption :  $\theta \ll 1$

$$\frac{df(x)}{dx} = \tan\theta \approx \theta \quad \text{at P}$$

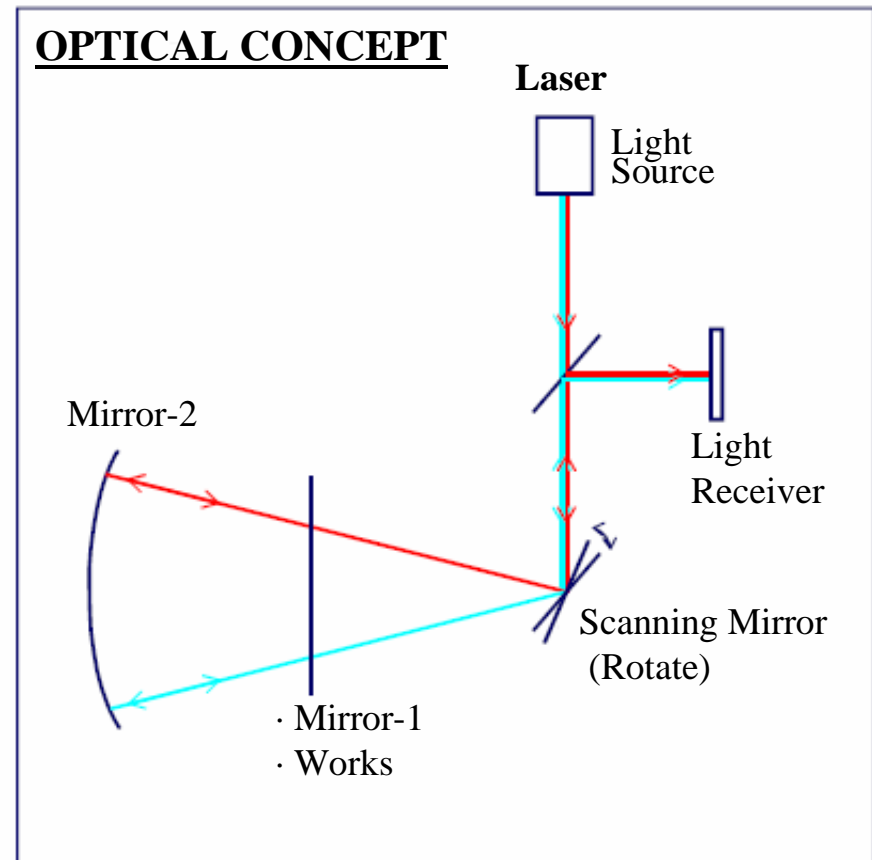
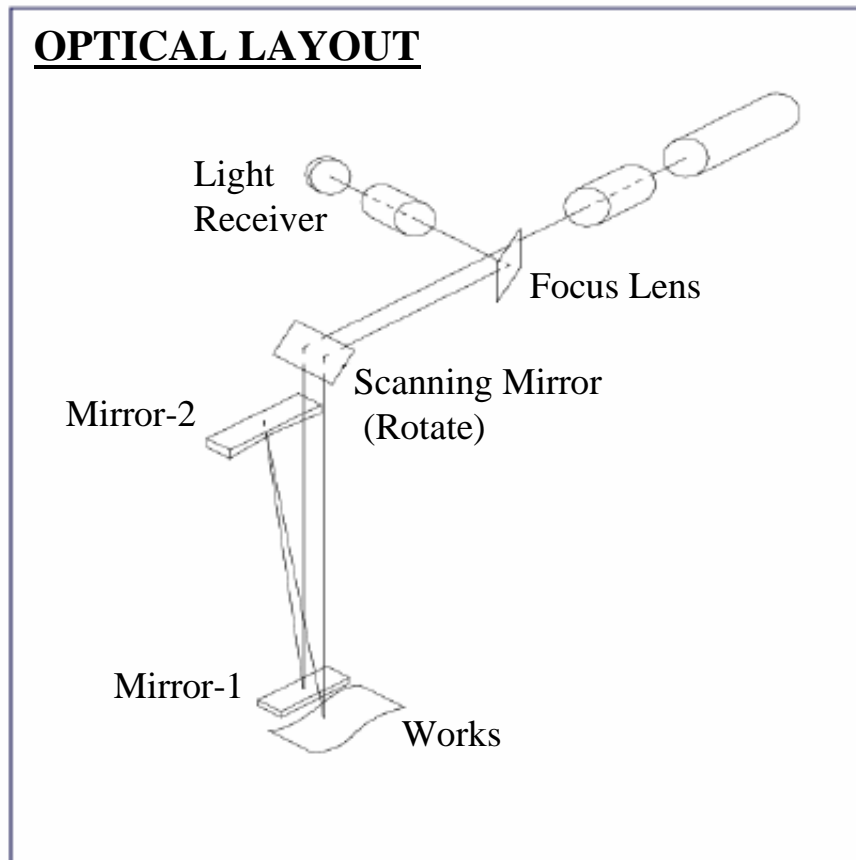
$$\Delta = 2\theta l$$

$$\alpha \int dx \Delta(x) = \int dx \theta(x) = f(x)$$

$$\alpha = 1/(2l)$$

# CORE SYSTEM – LASER IMAGE PROFILER

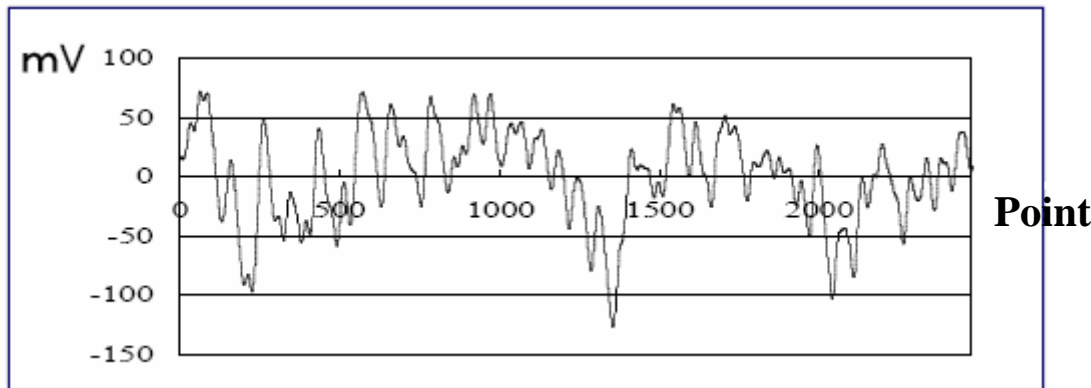
 *Patented Optical Technology*



# CORE SYSTEM – LASER IMAGE PROFILER



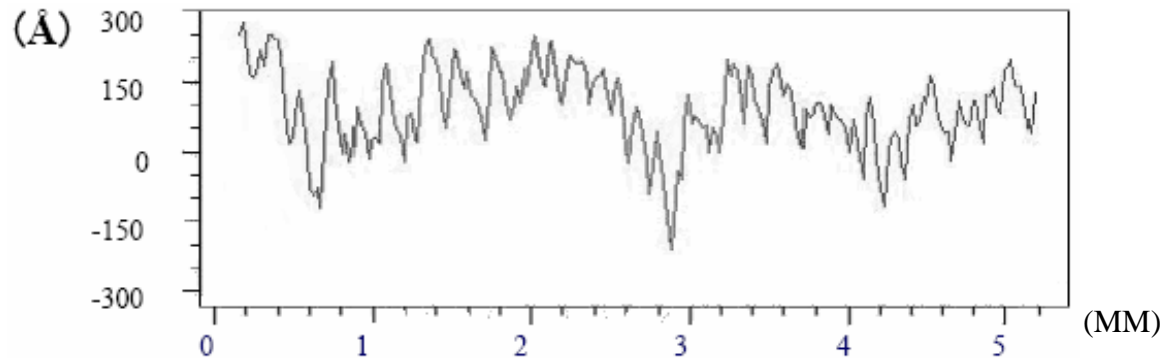
*Surface Profile Inspection Results:  
Identical to Optical Measurement (Over 98%)*



CORE SYSTEM  
LASER  
MEASUREMENT  
RESULT

SAMPLE 2500 POINTS:

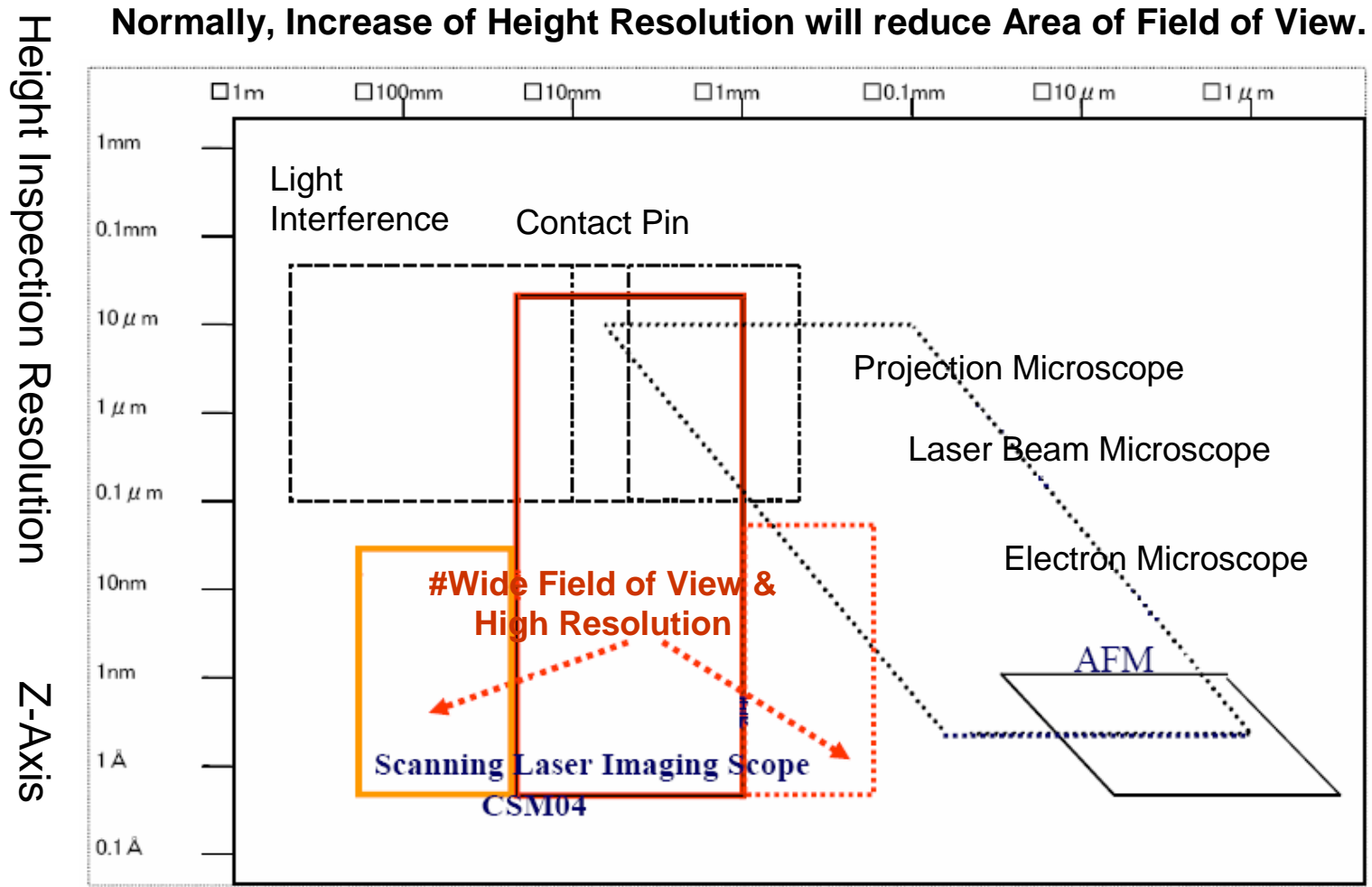
Works: Polygon Mirror, Measured Distance: about 5mm, 1MHz 8bit



'A' COMPANY  
OPTICAL  
MEASUREMENT  
RESULT

# CORE SYSTEM – LASER IMAGE PROFILER

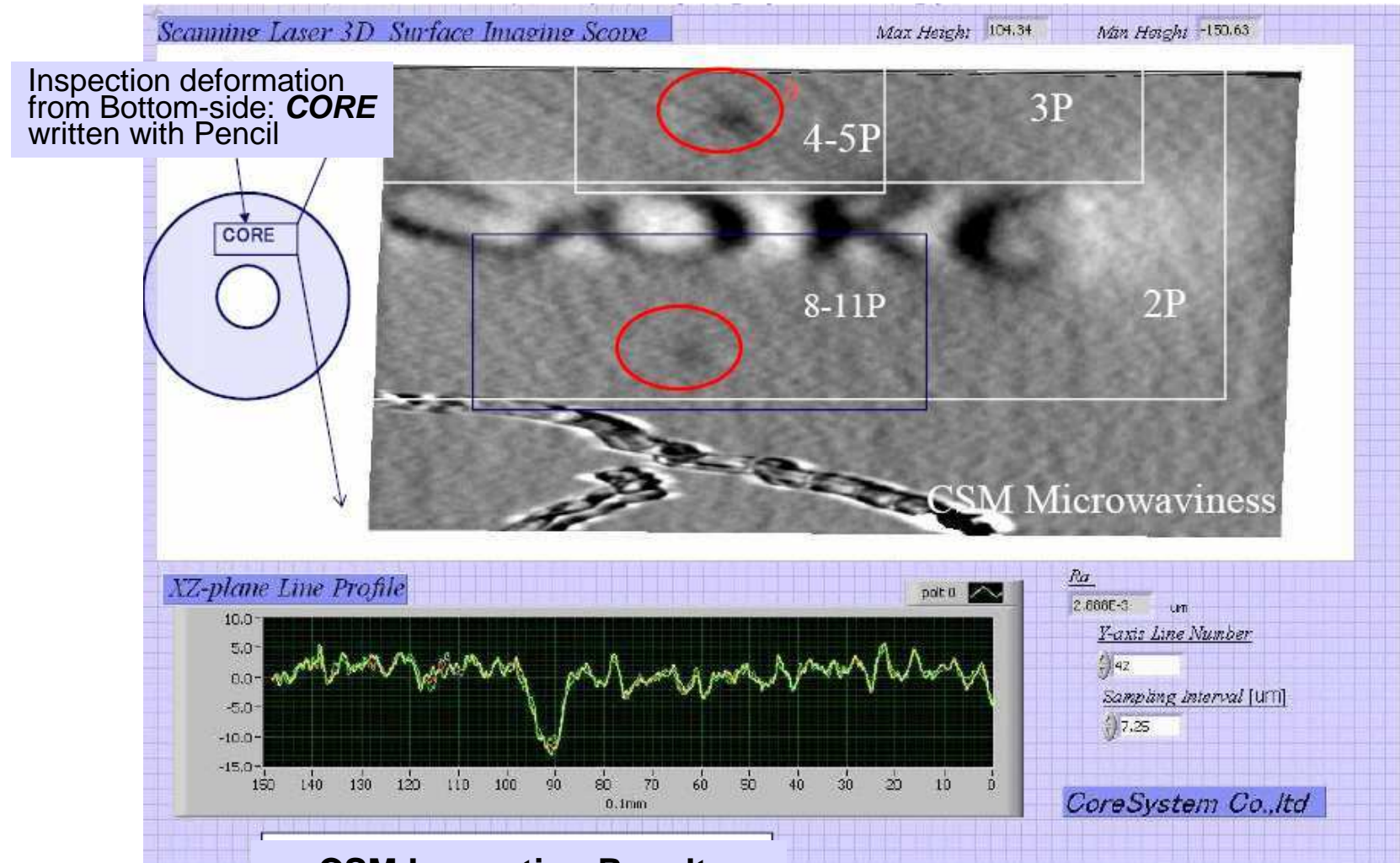
## Inspection Field of View Comparison (Surface Area)



*#CORE System Development Target*

# CORE SYSTEM – LASER IMAGE PROFILER

## Field of View Comparison (Aluminium HD)

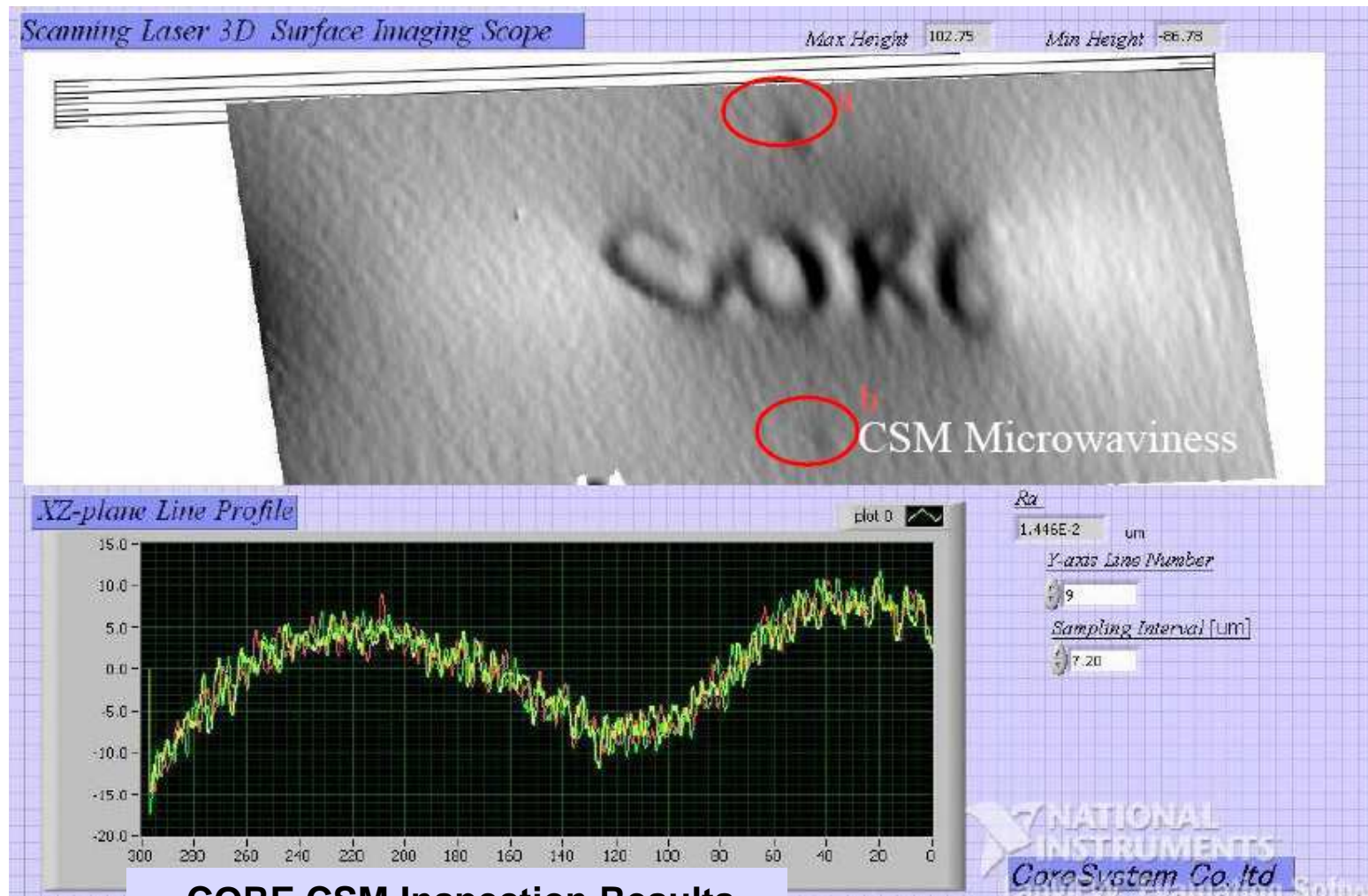




# CORE SYSTEM – LASER IMAGE PROFILER

## *Field of View Comparison - Test*

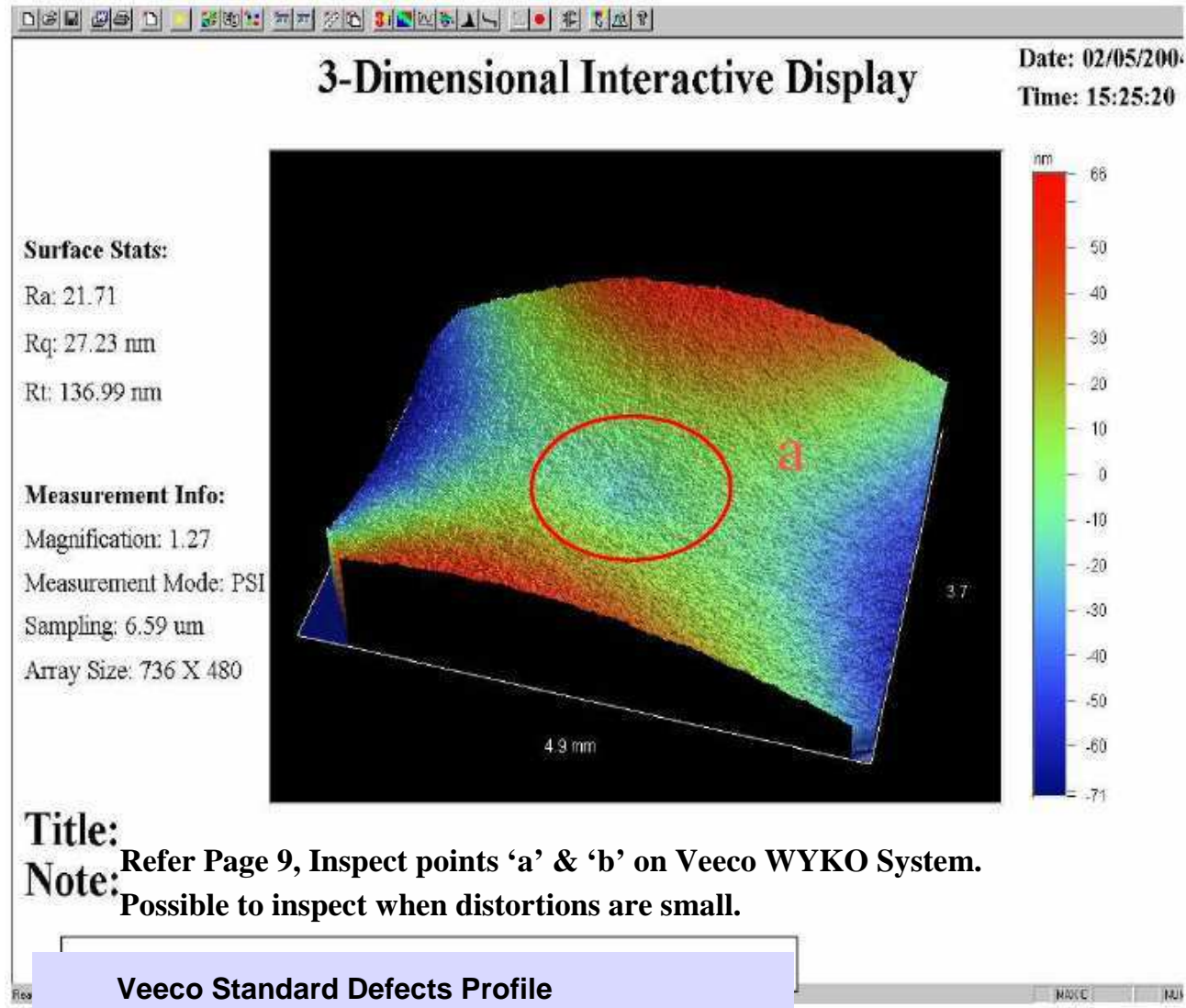
CORE CSM System can detect image clearly.



**CORE CSM Inspection Results**

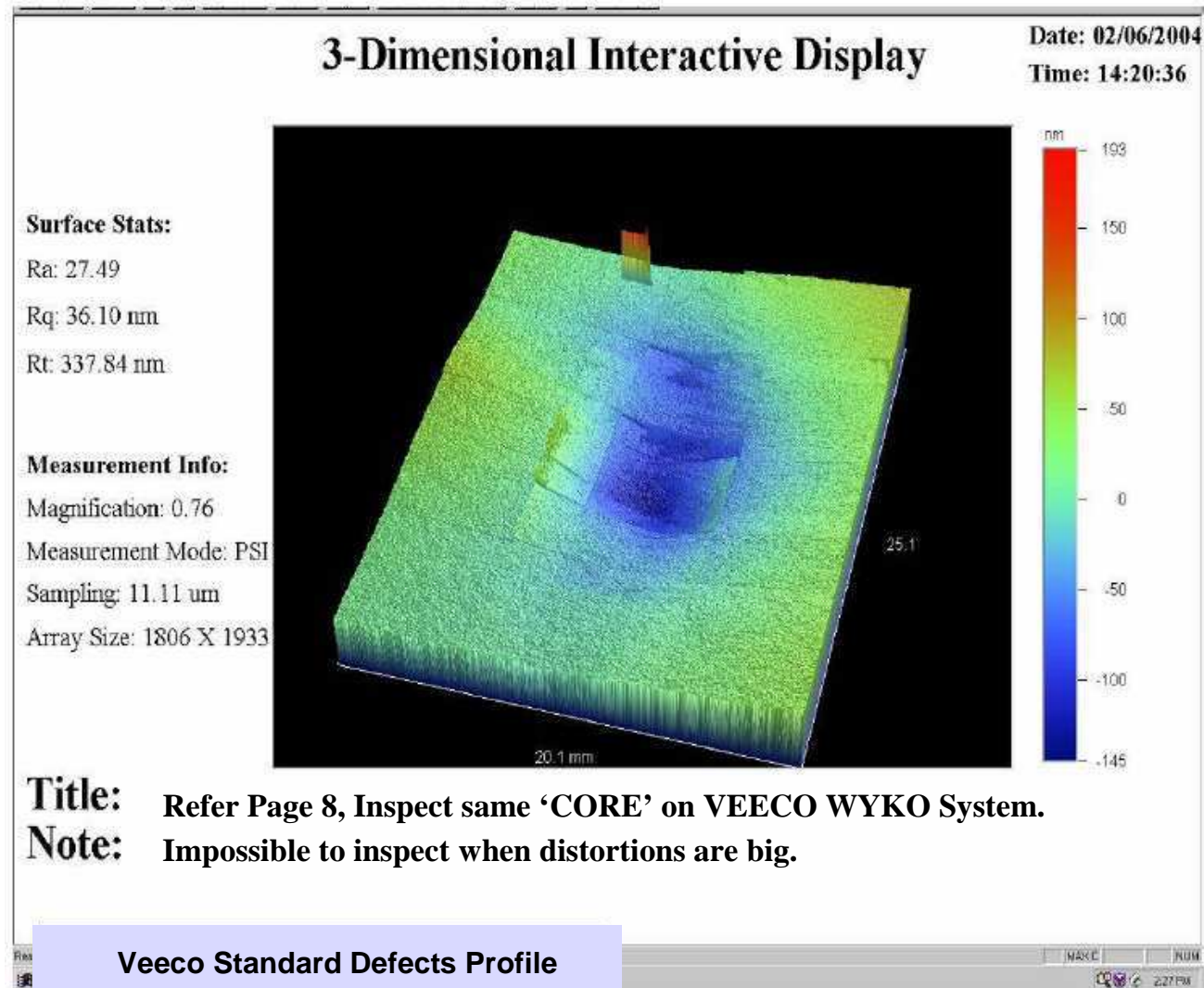
# CORE SYSTEM – LASER IMAGE PROFILER

## *Field of View Comparison - Test*



# CORE SYSTEM – LASER IMAGE PROFILER

## *Field of View Comparison - Test*

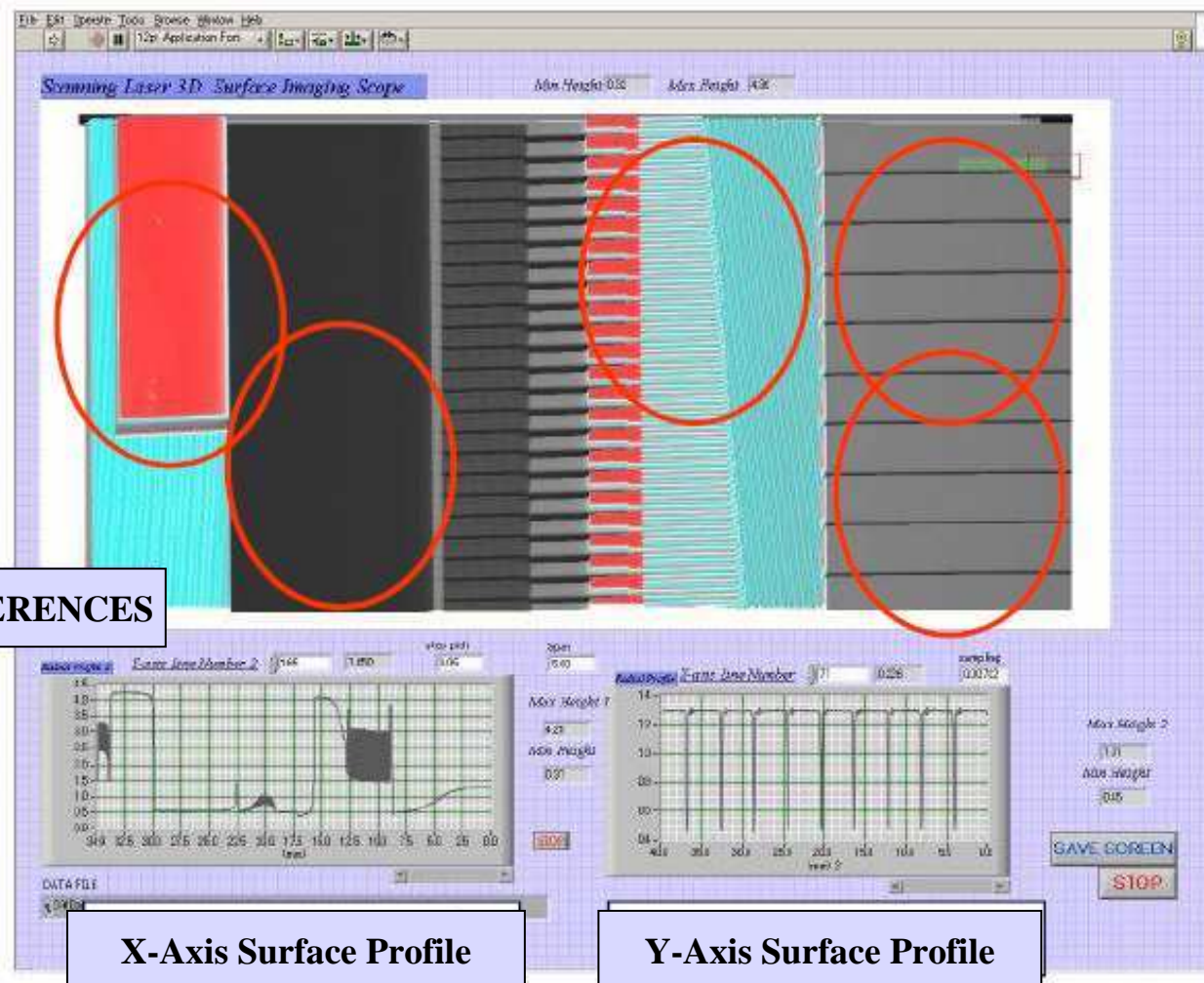




# CORE SYSTEM – LASER IMAGE PROFILER

## *CSM-Series – ITO PATTERN INSPECTION*

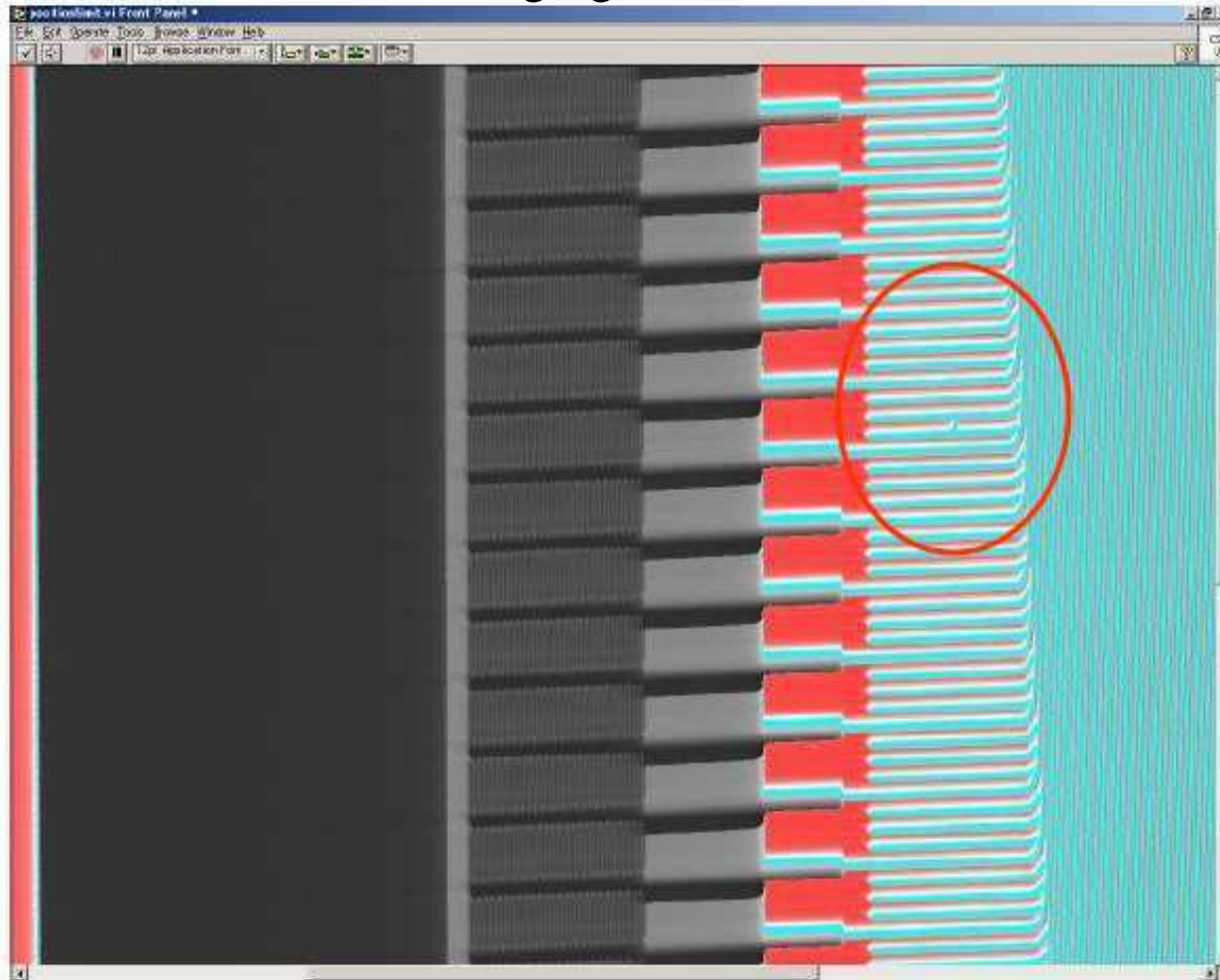
30x30mm Wide Field of View & High Resolution Inspection Image



# CORE SYSTEM – LASER IMAGE PROFILER

 *CSM-Series – ITO PATTERN INSPECTION*

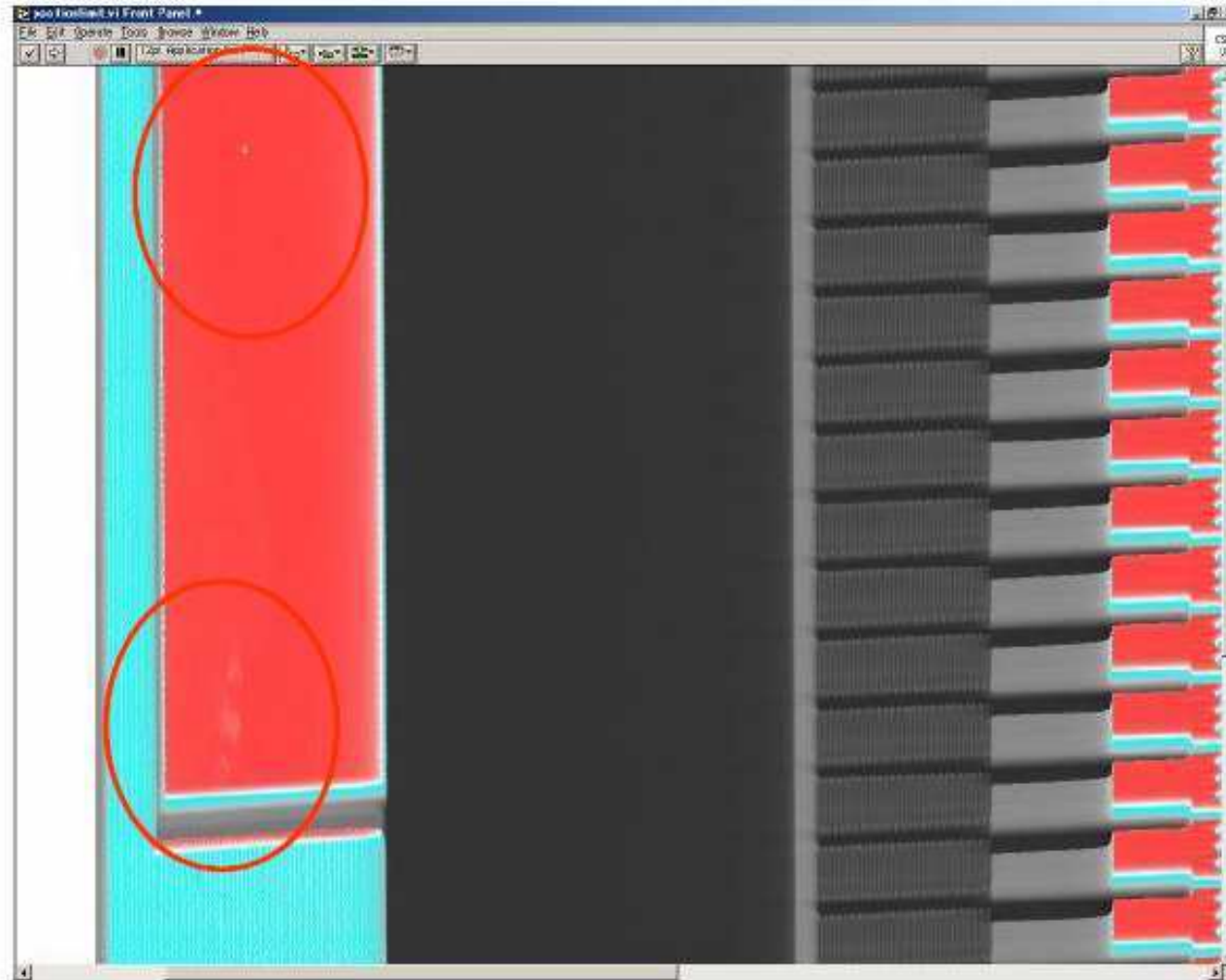
ITO Pattern Lines Bridging



# CORE SYSTEM – LASER IMAGE PROFILER

## *CSM-Series – ITO PATTERN INSPECTION*

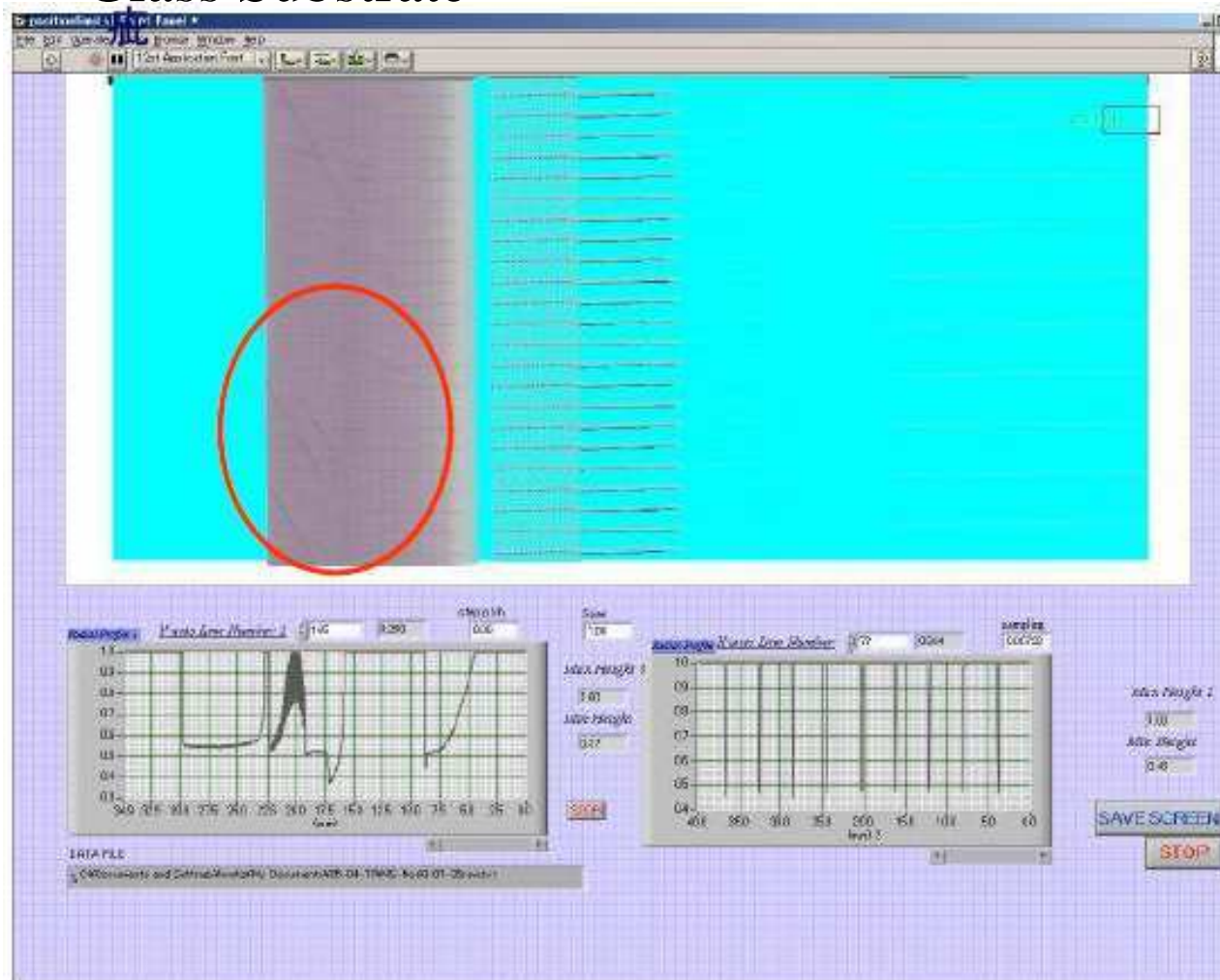
Height Variation due to embedded Dust Particles



# CORE SYSTEM – LASER IMAGE PROFILER

 *CSM-Series – ITO PATTERN INSPECTION*

Glass Substrate

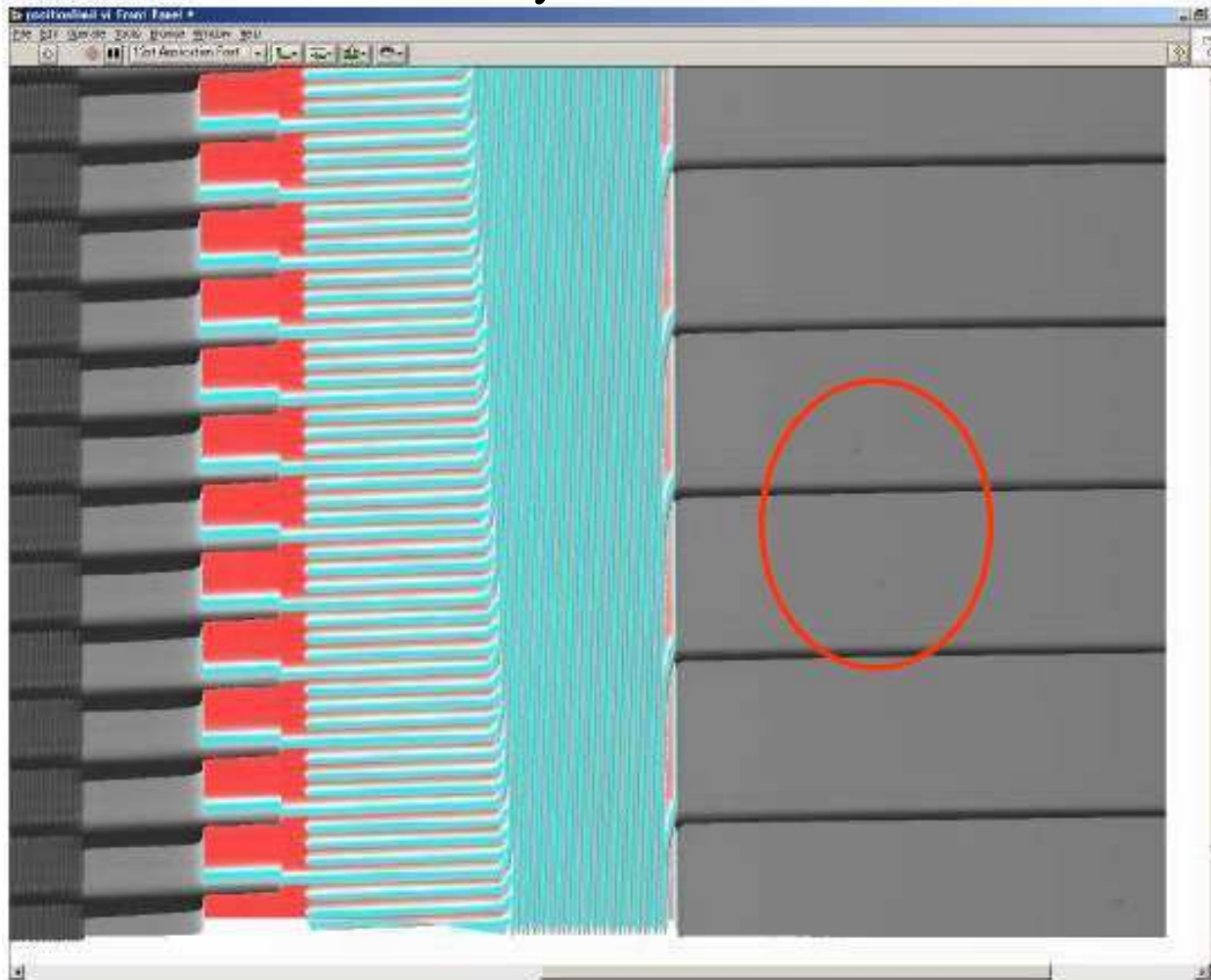




# CORE SYSTEM – LASER IMAGE PROFILER

## *CSM-Series – ITO PATTERN INSPECTION*

Minute Defect caused by Dust Particle

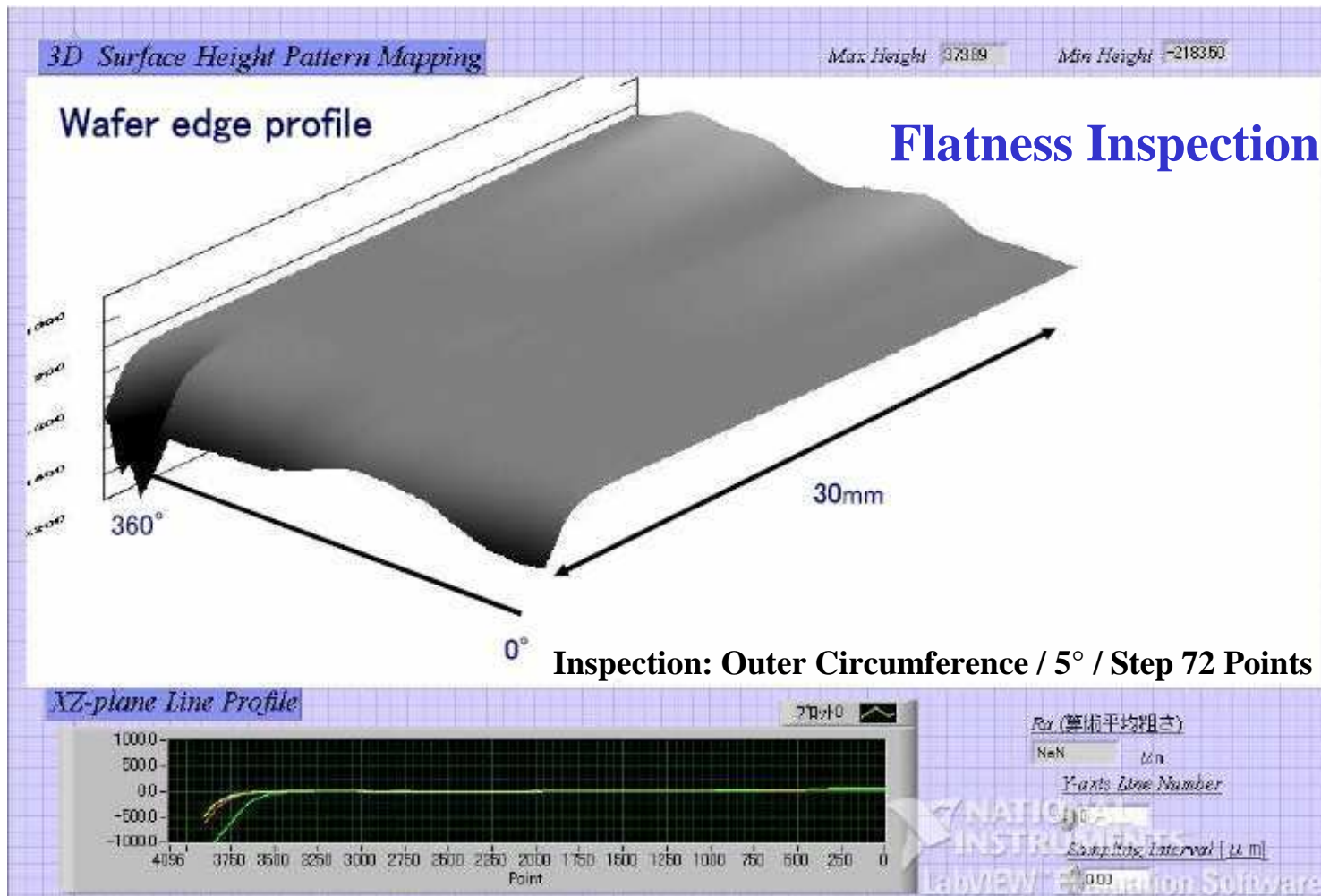




# CORE SYSTEM – LASER IMAGE PROFILER

## SILICON WAFER INSPECTION

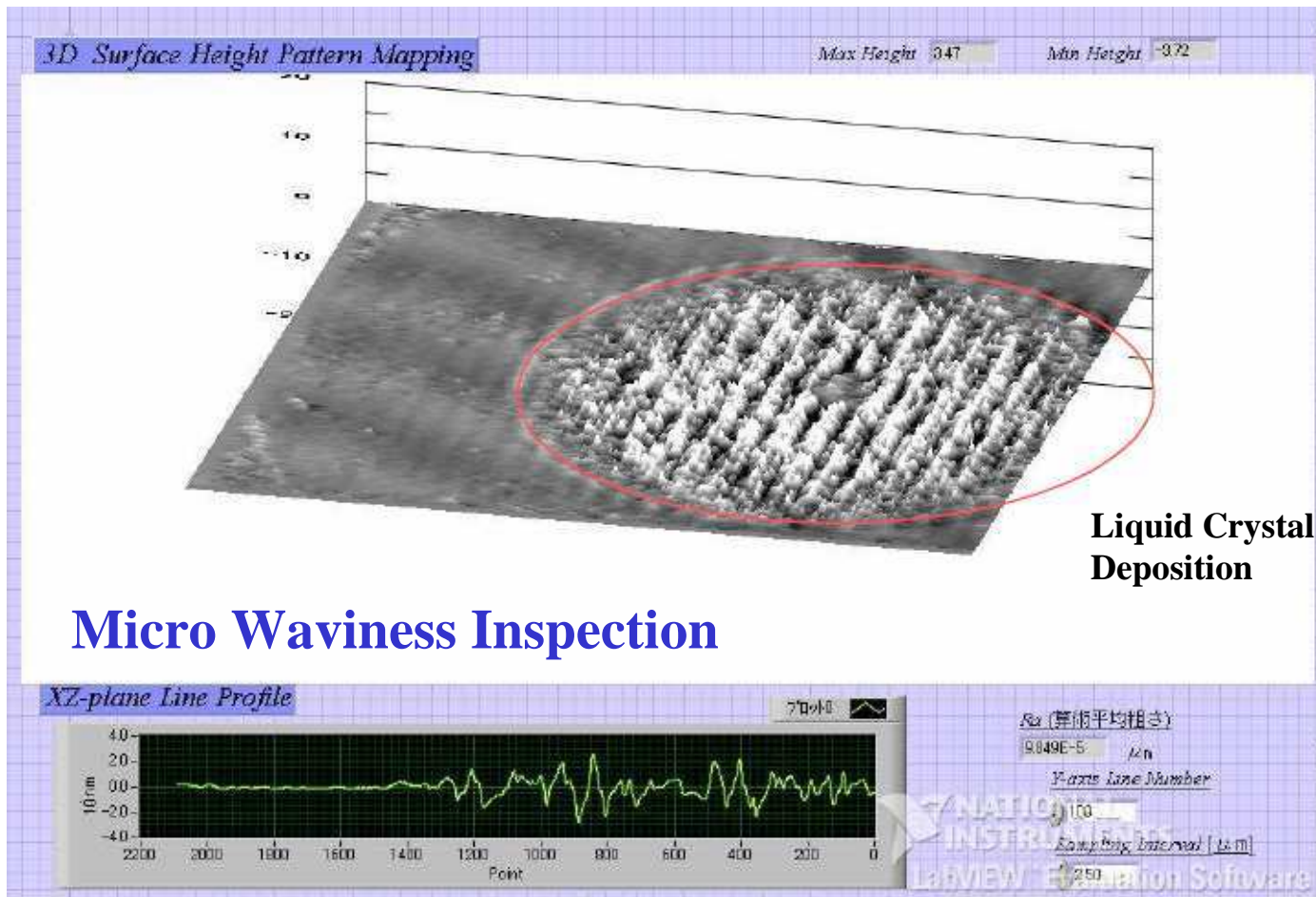
### Outer Circumference Inspection



# CORE SYSTEM – LASER IMAGE PROFILER

## LCD – OPTICAL RUBBING TEST

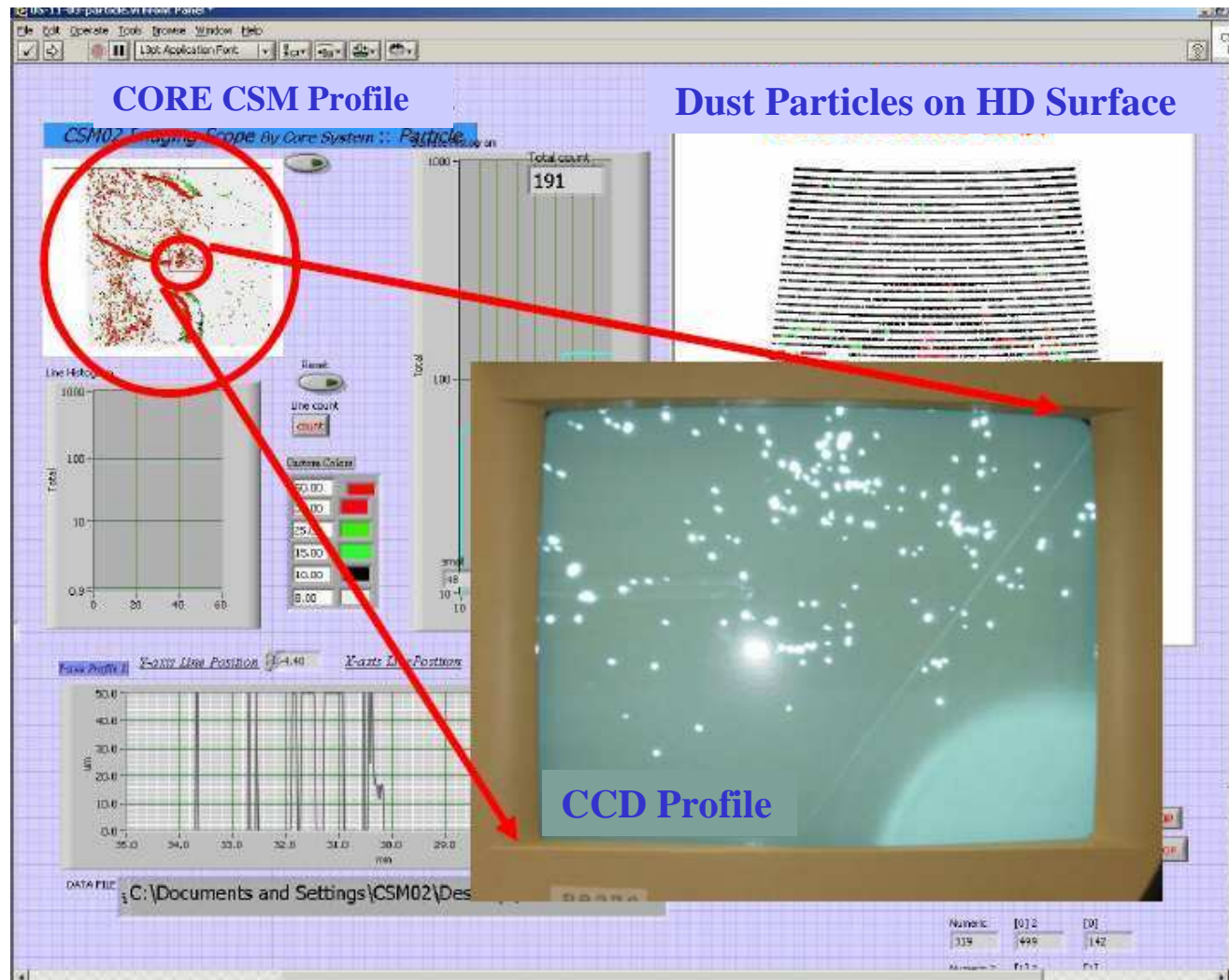
To inspect the test result of Optical Rubbing on Liquid Crystal  
(To spot UV on laminated PVC mask on transparent glass.)



# CORE SYSTEM – LASER IMAGE PROFILER



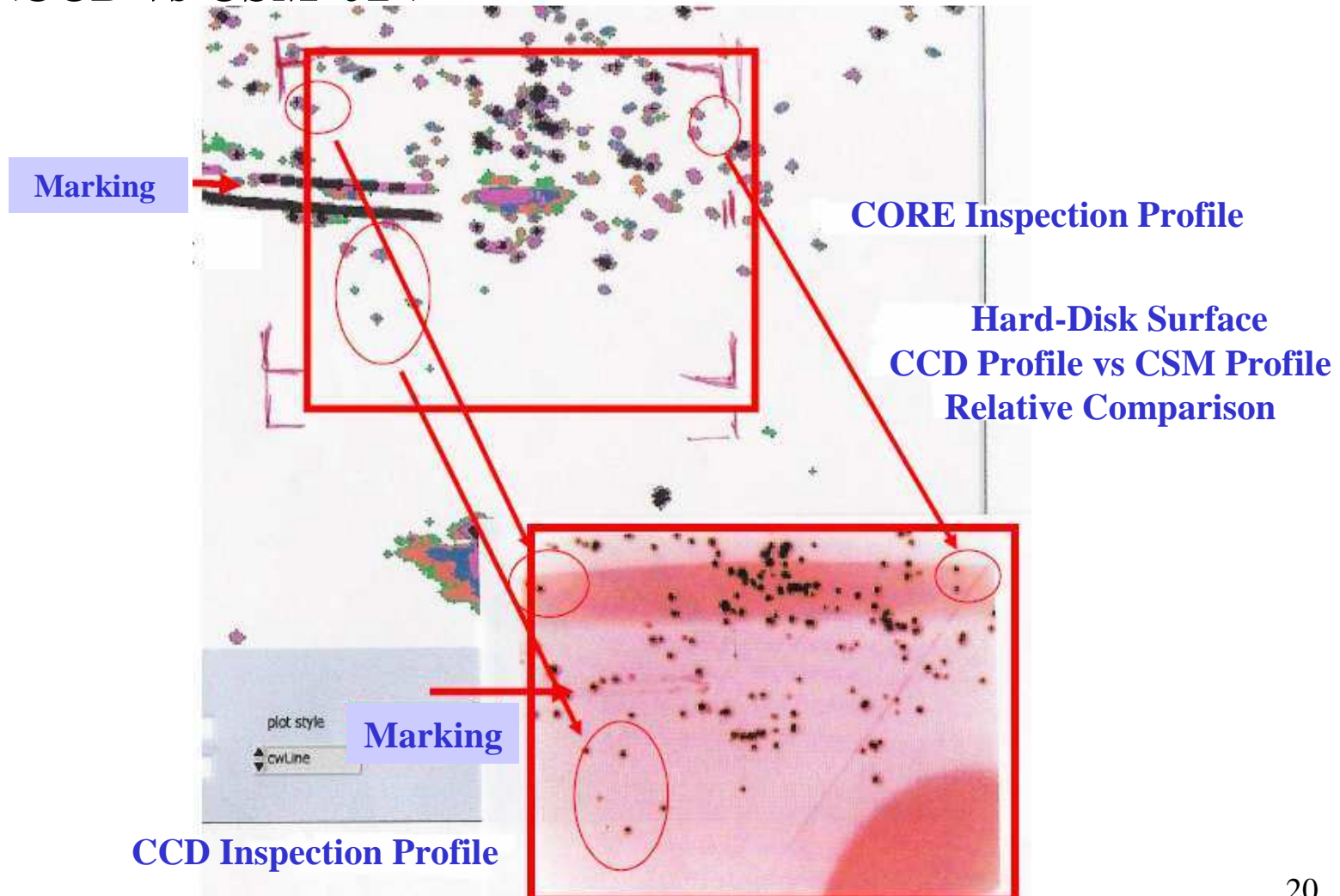
## *HARD-DISK – DUST PARTICLES INSPECTION* *<CCD vs CSM-02 >*





# CORE SYSTEM – LASER IMAGE PROFILER

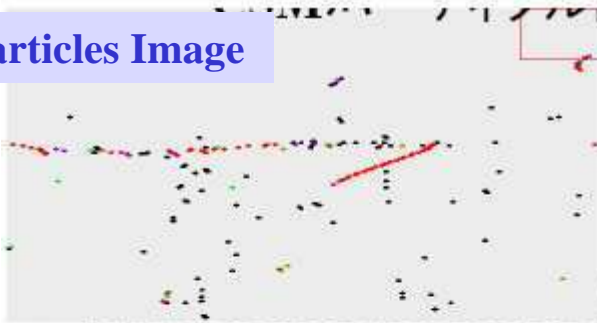
## *HARD-DISK – DUST PARTICLES INSPECTION* <CCD vs CSM-02 >



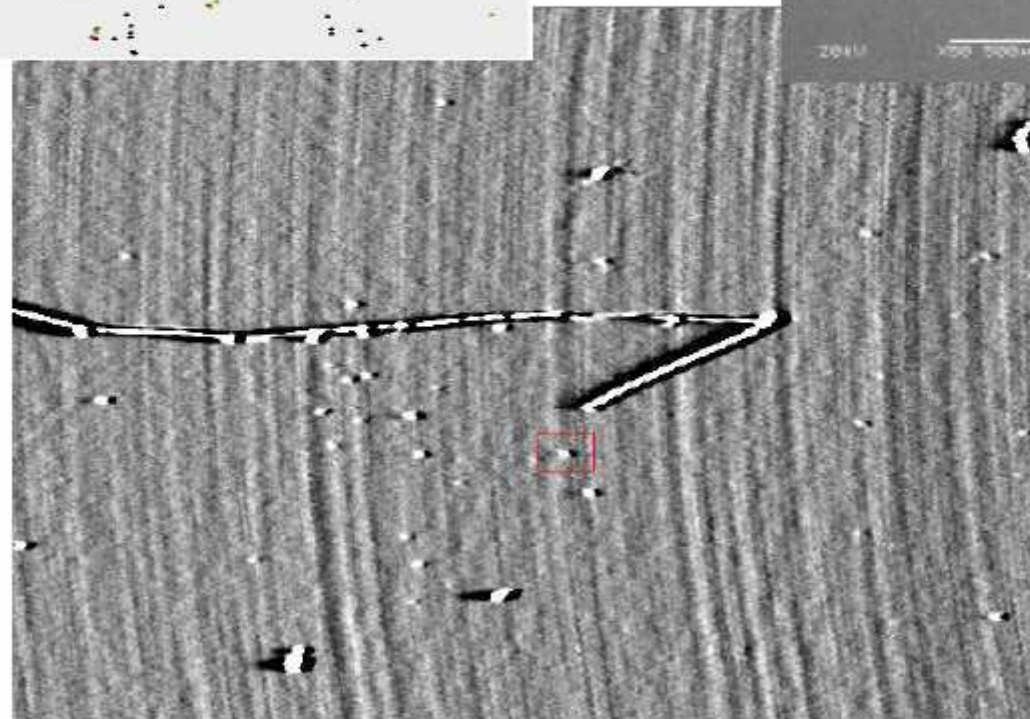
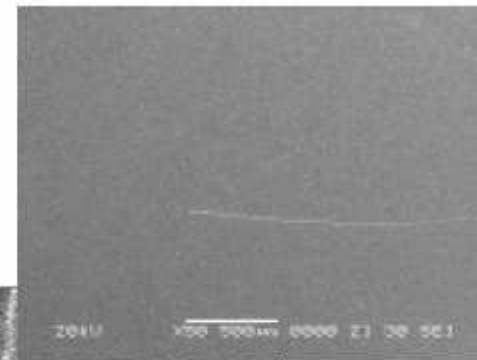
# CORE SYSTEM – LASER IMAGE PROFILER

 **HARD-DISK – DUST PARTICLES INSPECTION**  
**<CCD vs CSM-02 >**

CSM Particles Image



SEM Image



CSM04

# CORE SYSTEM – LASER IMAGE PROFILER

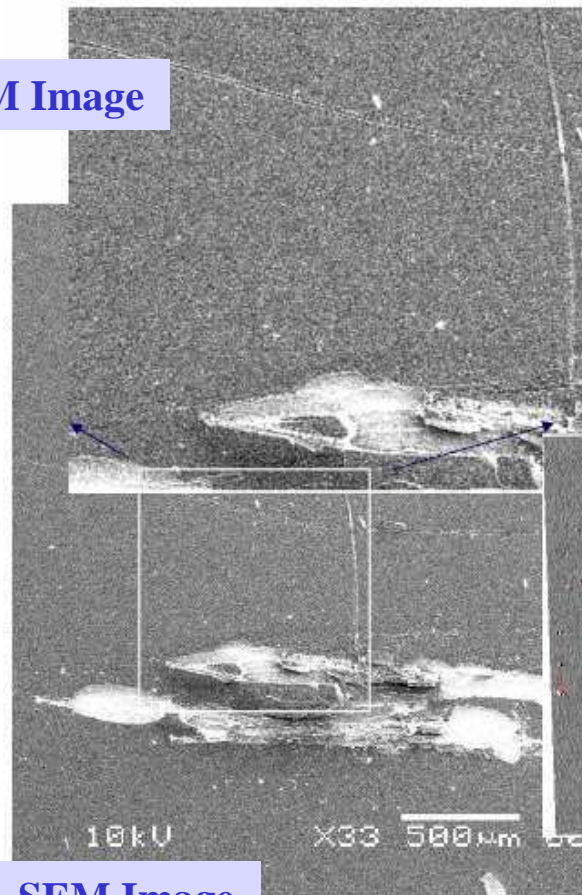


## *HARD-DISK – DUST PARTICLES INSPECTION*

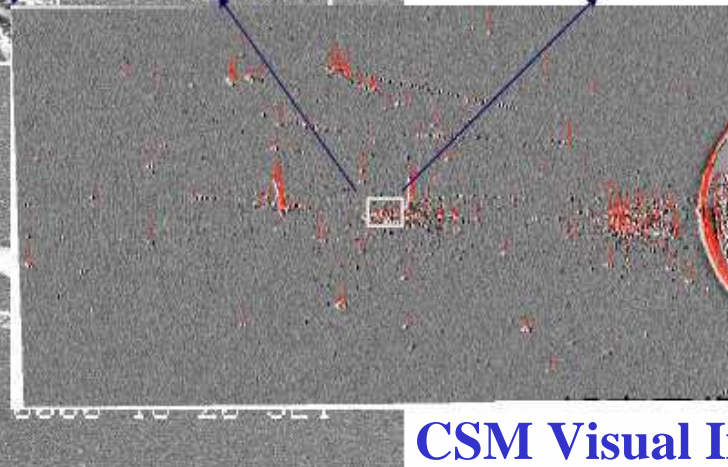
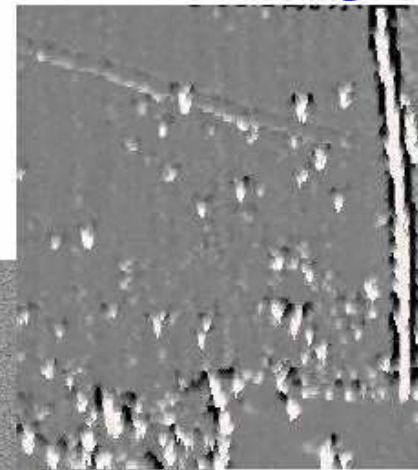
*< SEM Verifications of CSM Detected Defects >*

**CSM Enlarged Visual Image**

**SEM Image**



**SEM Image**



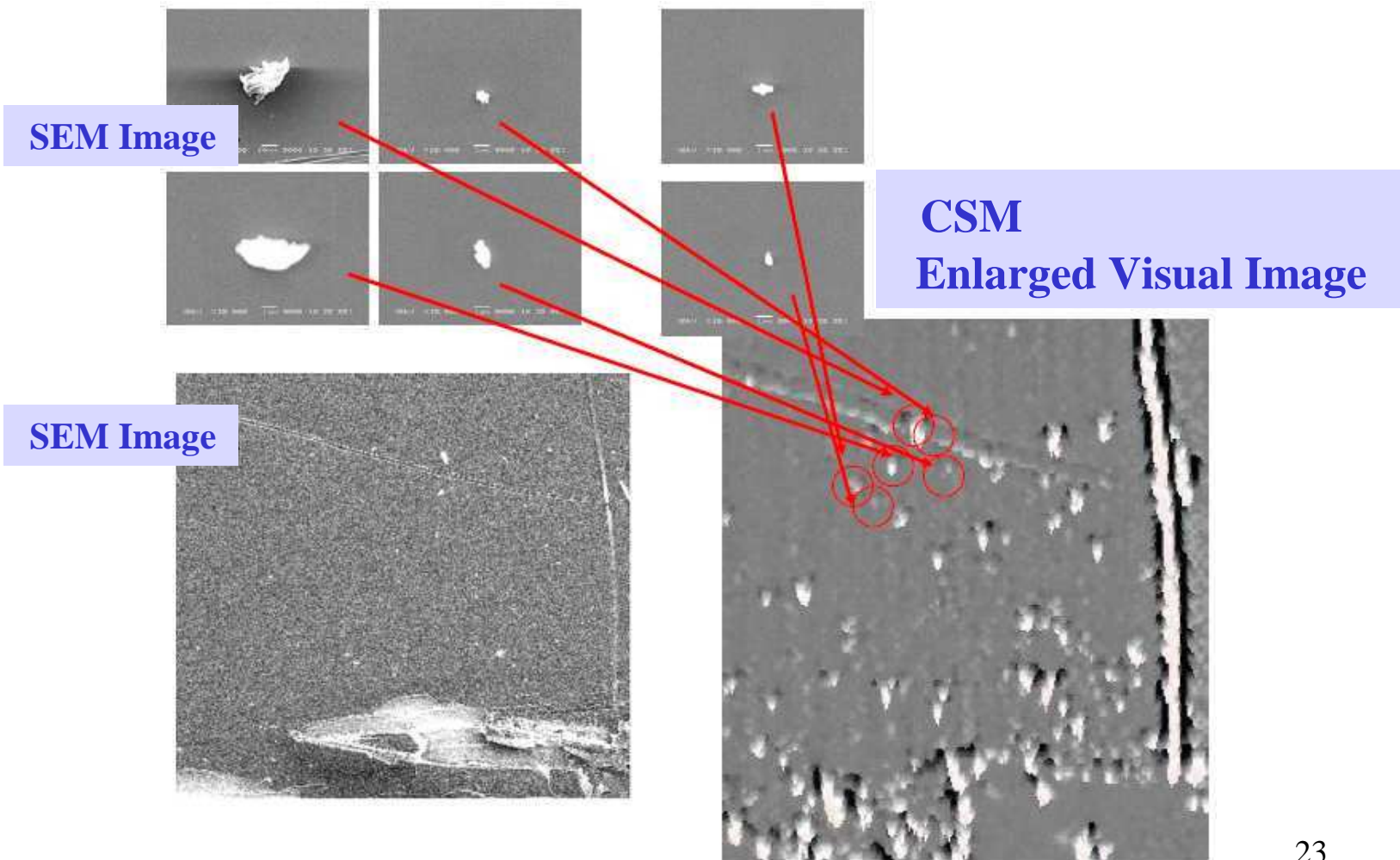
**CSM Visual Image**



# CORE SYSTEM – LASER IMAGE PROFILER

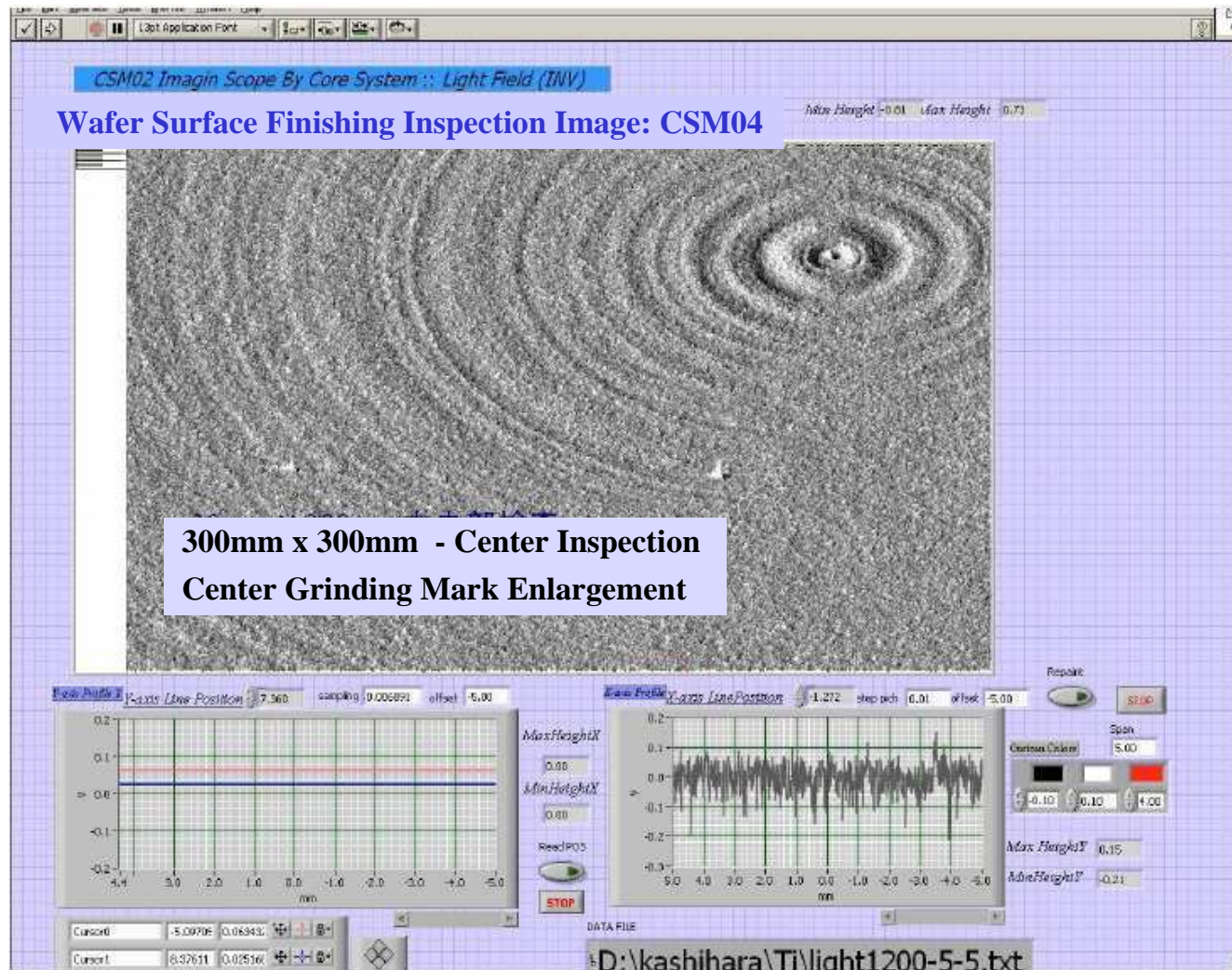


## *HARD-DISK – DUST PARTICLES INSPECTION* *< SEM Verifications of CSM Detected Defects >*



# CORE SYSTEM – LASER IMAGE PROFILER

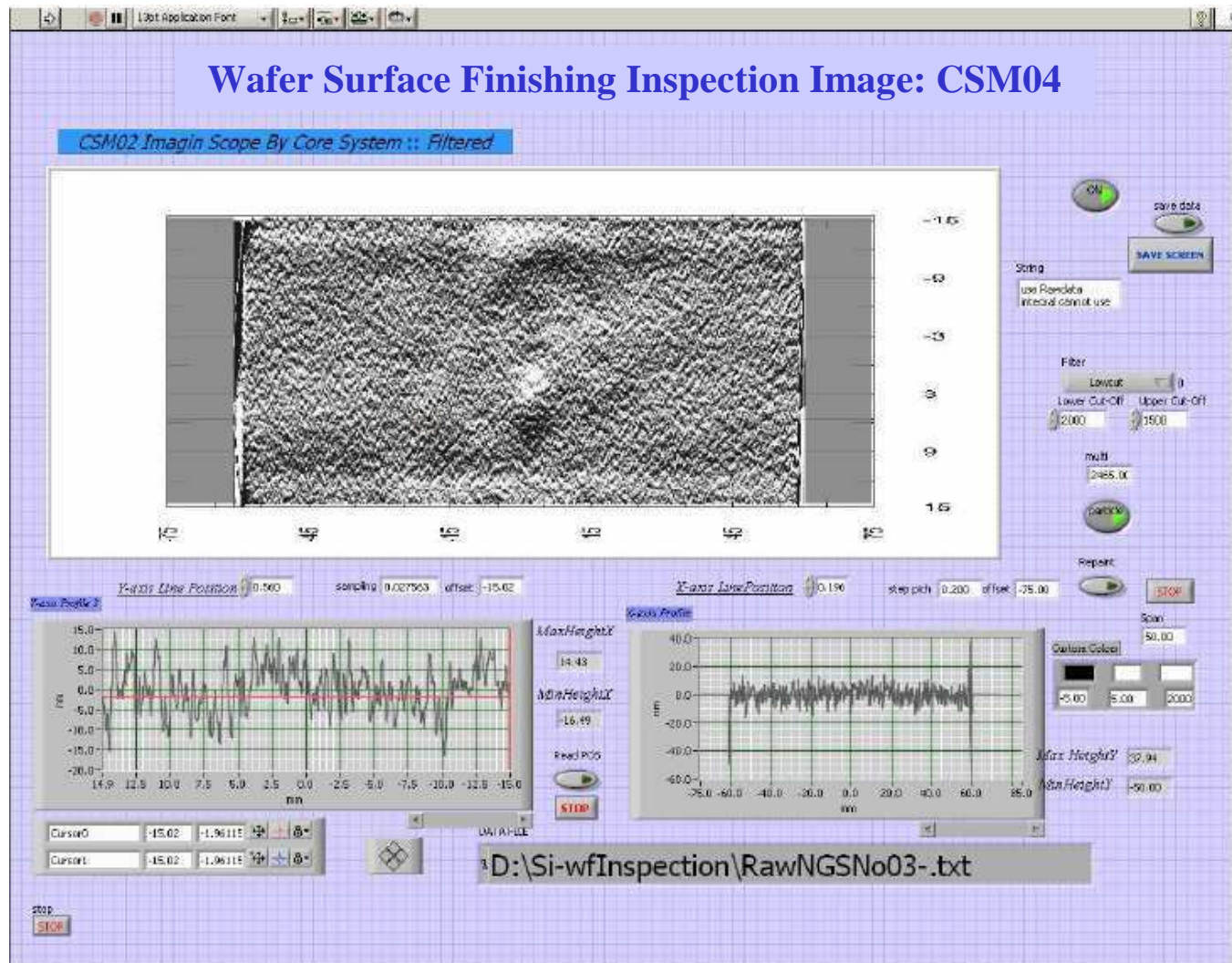
## WAFER – SURFACE INSPECTION





# CORE SYSTEM – LASER IMAGE PROFILER

## WAFER – SURFACE INSPECTION



# CORE SYSTEM – LASER IMAGE PROFILER

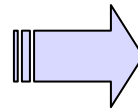


## *MARKET DEMAND – Hard-Disk Surface Inspection*

The increasing requirements of high density (Vertical Recording / Discrete Format) Hard-Disk Inspection for Surface Flatness · Defects is now beyond the limits of Optical Inspections.

### [MARKET REQUIREMENTS]

- \*Surface Flatness: 1nm
- \*Defect Size: Ø80nm  
x Depth 50nm
- \*Defects Analysis
- \*In-Line 100% Inspection System  
Inspection Speed: 500pph



### [MARKET REQUIREMENTS]

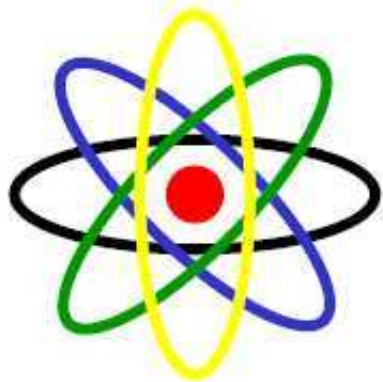
- \*Surface Flatness: 10nm
- \*Defect Size: Ø500nm  
x Depth 500nm

### [CORE SYSTEM – CSM SERIES]

- \*Surface Flatness: 0,1nm
- \*Defect Size: Ø80nm  
x Depth 50nm
- »Composite Analysis System Dev.
- »In-Line 100% Inspection System  
Inspection Speed: 500pph

# CORE SYSTEM – LASER IMAGE PROFILER

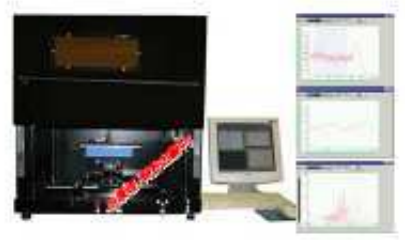
<p><b>Introduction</b></p> <p><b>Firm Name</b> Core System Co., Ltd.  <b>Representative</b> President Mr. Masaru Otsuda  <b>Established date</b> 1987 June  <b>Capital</b> ¥50,000,000 ( June 28th 2004)  <b>Place</b> 2-2-2, Nakadaira Nagakuchi, Niigata Prefecture 940-0034          Tel : 0255-31-5100          Fax : 0255-31-5104          E-mail : <a href="mailto:sales@csys.jp">sales@csys.jp</a> (to technical department)  <a href="mailto:info@csys.jp">info@csys.jp</a> (to Mr. Masaru Otsuda)</p> <p><b>Employee</b> 8</p> <p><b>Association</b> Niigata University          Niigata University of Technology          Niigata Industrial Technical College          Institute of Industrial Science, University Tokyo          Industrial Research Institute of Niigata Prefecture          Niigata Industrial Creation Organization          Shinanogawa Technopole Development Organization          Ohtsukubo Industry and Technology Development association</p> <p><b>Customer</b> Matsushita Electric Works, Ltd.          Nippon Sanki Co., Ltd.          Saisei Kogyo Co., Ltd. SHI Saki, SHI          Ioka Co., Ltd.          A.C Try Ltd.          Fuji Electric Device Technology Co., Ltd.          Fujitsu Co., Ltd. Yamagata Fujitsu Co., Ltd.          Toyo Kohan Co. Ltd. Kohan Kogyo Co. Ltd.          Showa Denko Co., Ltd. Showa Denko HD K.K.          Hitachi Global Storage Technologies, Inc.,          Konig, Saegata, Marbor Company/Mitsubishi,          Metaboli Corporation          Mitsubishi America Corporation</p> <p><b>Trading Company</b> Nivide Seisakusho Ltd. Amano Koshi Ltd.          Laplace Ltd. Yuko Electric Ltd.          Sun Electric Ltd. Makiyama Electric Co., Ltd.          Satoh Bunkin Co., Ltd. Kouyuu Electric Co., Ltd.</p> <p><b>Trading Bank</b> The Daiwa Bank Ltd. (Onotsouchi branch)          Taiko Bank Ltd.(Miyakoshi branch)          The Shoko Chuoetsu Bank Ltd.(Niigata branch)</p> <p><b>Business Outline</b>          1. System development, manufacturing, selling, service for:          a factory automation device, scanning &amp; measuring device          ① Imaging Scope          ( To scan a hard disk, a floppy drive, a liquid crystal panel          and a semiconductor Wafer)          ② Automatic cleaning and drying equipment for liquid crystal          panels.          Automatic cleaning and drying equipment for a container of          liquid crystal panels.          ③ CIM operating system          2. An adding enterprise for a new business by industry, school</p>	<p><b>LCD Cleaning system</b></p>  <p>W2135 × D916 × H1295</p> <p><b>[Feature]</b>          ・ Piece by piece cleaning by roll brushing          ・ High speed cleaning (10sec/1piece)          ・ The ease with maintenance          ・ Cleaning under no stress of work</p> <p><b>[Ready for work size]</b>          CF L(48.27~82.70) × W(25.37~117.1) L × 0.0~2.2          TFT L(48.1~106.6) × W(43.1~142.5) L × 0.0~2.2</p>
	<p><b>LCD Carrier Cleaning system</b></p>  <p>W3000 × D1200 × H1940</p> <p><b>[Feature]</b>          ・ High speed cleaning (10sec/1piece)          ・ The ease with maintenance          ・ This system has self-cleaning</p> <p><b>[Ready for work size]</b>          W233 × D294 × H420</p>
	<p><b>CIM (COMPUTER INTEGRATED MANUFACTURING) Software</b></p> <p><b>[OS / Programming language]</b>          ・ Sequential control : Mitsubishi Electric, OMPON/          Fuji Electric/Hitachi/NEC/NEC/ other          ・ Computer : Windows/UNIX          Programming language : Visual Basic/C language</p> <p><b>[Feature]</b>          System for the operator and of the operator          ① Consult with operators about the details process          ② The ease with maintenance          ③ System of managing a process at all time</p>



Core System



Scanning Laser Line Profiler & Imaging Scope



Scanning Laser Line Profiler



LCD Cleaning system



LCD Carrier Cleaning system



# CORE SYSTEM – LASER IMAGE PROFILER

## Scanning Laser Line Profiler & Imaging Scope Imaging Scope

### [Feature]

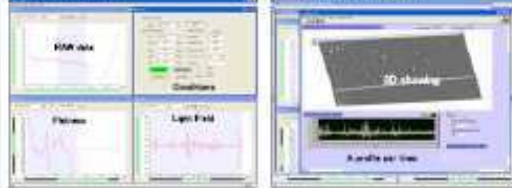
- No contact inspection by laser.
- Being able to inspect by  $0.1\mu\text{m}$  for a mirror surface.  
 $0.1\mu\text{m}$  for a rough surface
- Be strong against shaking (it doesn't need an installation against shaking), because of high speedy scanning ( $0.32\text{msec}/30\text{mm}/1\text{line}$ )
- Being able to scan a big area,  $30 \times 30\text{mm}$

### [Measuring for]

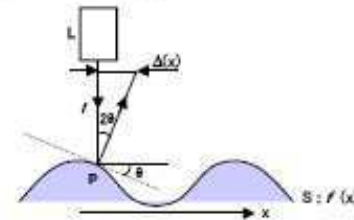
- A mirror surface such as a semiconductor Wafer, a hard disk and a LCD flat panel, or a sputtering surface of metal and a high molecule material.
- A rough surface such as a copy drum.



### Data showing

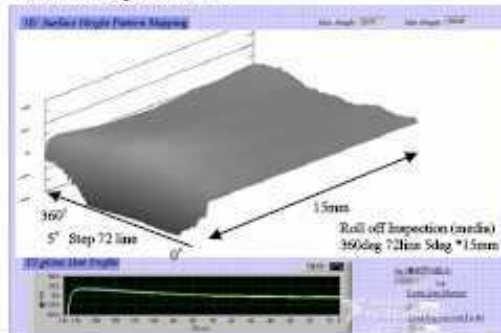


### Theory

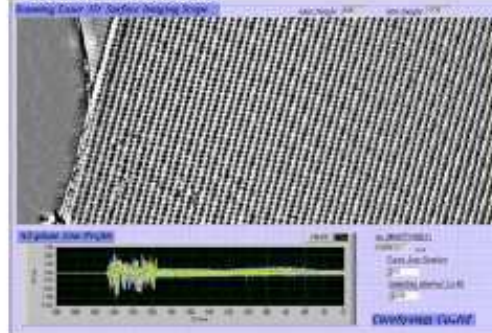


Model	CSM02	CSM04	
Angle of object to be examined	$\pm 4.3^\circ$	$\pm 4.3^\circ$	
Laser	Red Semicon. Laser	Blue Semicon. Laser	
	Wave length	655nm	405nm
	Power	Max. 30mW	30mW
	Class	Class 3b	Class 3c
Diameter	$\phi 25 \mu\text{m}$	$\phi 10 \mu\text{m}$	
Scan Length	30mm	30mm	
Scan Speed	30mm/0.52msec/line	30mm/0.52msec/line	
Scan Height	0.1mm	0.1mm	
Scan Width	25 $\mu\text{m}$	10 $\mu\text{m}$	
Data Acquisition Speed	$\sim 8\text{MHz}$	$\sim 10\text{MHz}$	
Scan line: 30/30/100 $\mu\text{m}$ pitch/line 1 time	50sec	50sec	
Ave. treatment times	1 to 99 times	1 to 99 times	
Showing mode	Flatness	To examine flatness	To examine flatness
	Microwaves	To examine roughness	To examine roughness
Light Field		To examine slope	To examine slope
	X-Y-Rolling	X axis $\pm 50\text{mm}$ (0.002mm "Pitch")	$\pm 50\text{mm}$ (0.002mm "Pitch")
Positioning	Y axis	$\pm 50\text{mm}$ (0.002mm "Pitch")	$\pm 50\text{mm}$ (0.002mm "Pitch")
	Rolling Axis	360° (0.01° "Pitch")	360° (0.01° "Pitch")
Inducation	A profile per 3D showing	A profile per 3D showing	
Utility	AC100V $\pm 15\%$ /15A	AC100V $\pm 15\%$ /15A	

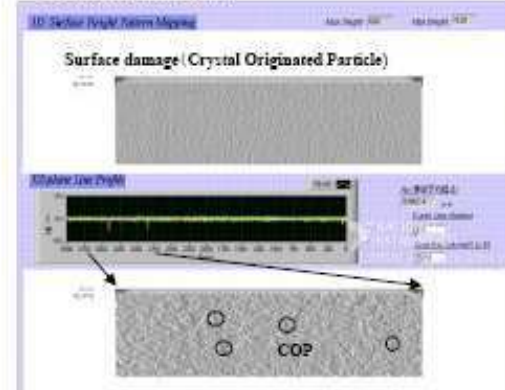
An outside edge of a hard disk



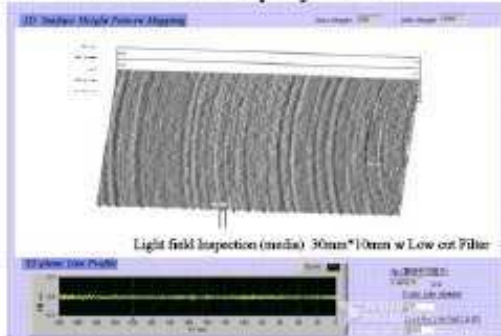
A surface of a liquid panel



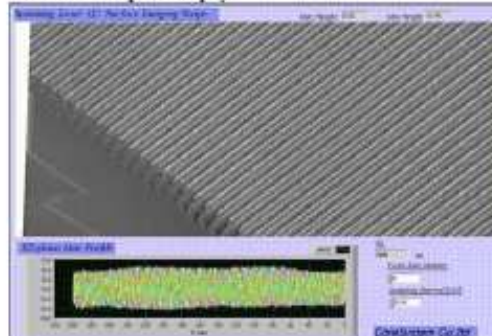
A surface of Silicon Wafer



The surface of a hard disk. (After getting on texture)



A surface of a plasma display



A surface of semiconductor pattern

