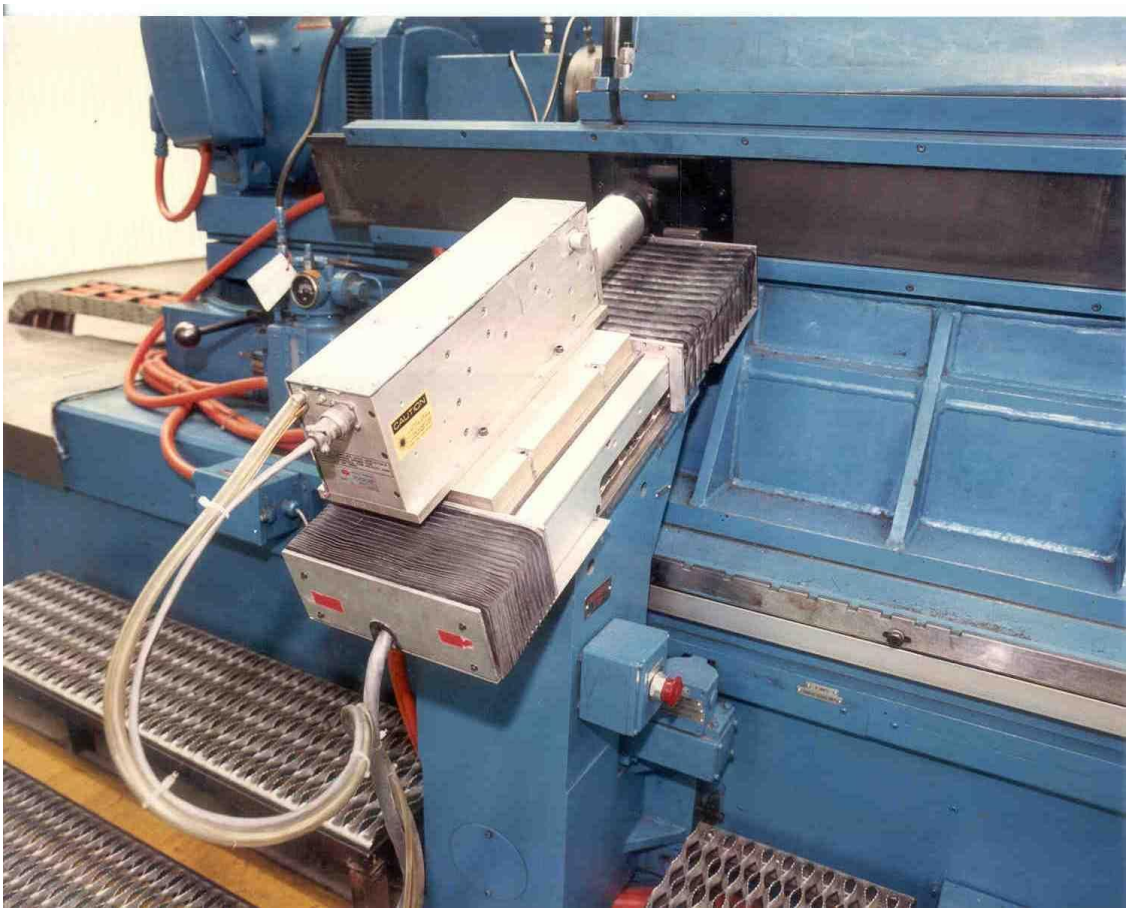
Lasertalk Sales Demonstration

Lasertalk was founded in 1995 some twenty years ago focusing our energies on non-contact measurement instrumentation. Our primary product line is directed to the jet engine industries. Our personnel have been serving this industry for more than 35 years qualifying us as the one of the best companies in the jet engine rotor measurement field.

Our personnel were a part of the original design team that developed the LaserMike "E-rom" measurement system, that was the industry standard for many years.

Original "E-rom" measurement system

The same design team, working in conjunction with General Electric, went on to develop the next generation gauge a much faster and more accurate gauge, the LaserMike model 81, which continued to dominate the industry as the standard for rotor measurement.



Original LaserMike model 81 Laser Probe

Lasertalk, realizing that there are newer technologies that could make major improvements over the, LaserMike model 81, Lasertalk has gone on to develop the next generation laser gauge Model LT81 designed to address the industries needs with significant improvements over the previous LaserMike model 81.

Lasertalk Model LT81 Laser Probe

What is it?

The LT81 is a form, fit, function replacement for the LaserMike Model 81

The LT81 consists of a high speed laser-diode based probe and a PC computer running a windows operating system as the user interface

Model LT81 Features

Enhanced Performance

- **Improved blade surface finish tolerance**
- **Improved blade reflection tolerance**
- **DSP technology**
- **Significantly faster measurement cycles**
- **Eliminates need to brush or de-burr before measurement**

Added Capabilities

- **Turbine (pocketed blade) measurement**
- **Automated blade setup program**
- **Lands and Seals measurement**
- **Total indicated run out (TIR) detection**
- **The ability to add and store notes specific to the product under test**
- **Automatic temperature compensation**

Improved Operation

- **User friendly Windows XP-based interface and control program**
- **Rotor library space virtually unlimited, with ability to organize into families**
- **Built in Operator's Manual**
- **Simple and automatic conversions from mm to inch and/or radius to diameter**
- **Results printed to local or networked Windows printer**
- **Results exported to Excel or XML formats for remote access and archiving**
- **Multiple security levels**
- **Automatic logging of operation or setup events**
- **Graphic display of measurement results**
- **Built-in test and diagnostics features**
- **Be prepared this system will tell you things about your process that**

were not possible with the older system

Improved Reliability & Serviceability

- **"Drop-in" replacement for LaserMike Model 81 system (same form, fit, function)**
- **Solid state laser diode source**
- **Utilizes current technologies (eliminates obsolescence issues of LM 81)**
- **Eliminates shop air purging and contamination of optics**
- **Probe package is O-ring sealed to help keep optics clean.**
- **Modular mechanical and electronic design**
- **Software updates performed from PC, locally or remotely (via telephone or Internet connection)**
- **Remote assistance or maintenance via telephone or Internet connection**
- **Built in stop / crash switch**
- **Full set of manuals including operators, and technical**

Product Comparison

The following tables provide a detailed comparison of the specifications between the Model 81 you are currently using (Old System) and the Lasertalk LT81.

Product Comparison		
Specification	**Model LT81**	**Model 81**
Servo Positioning Range	10 Inches	10 Inches
Servo Positioning Range	16 Inches	16 Inches
Servo Positioning Range	20 Inches	20 Inches
Minimum Blade Thickness	0.010 Inches / 0.250 mm	0.030 Inches / 0.762 mm
Maximum DSP digitizing rate	2 MHz	NA
Maximum Blade tip velocity for Blades	7,000 inch/per second	
Maximum Blade tip velocity for Turbines	3,500 inch/per second	
Maximum RPM for Blades	10,000 RPM with 10 samples per blade	7000 RPM
Maximum RPM for Turbines		
Resolution per blade	± 0.00005 Inches (rounded to 0.0001) / 0.001 mm*	± 0.0001 Inches / 0.001 mm
Resolution per Stage	± 0.00005 Inches (rounded to 0.0001) / 0.001 mm*	± 0.0001 Inches / 0.001 mm
Repeatability per Blade	± 0.0001 Inches / 0.0025 mm*	± 0.0005 Inches / 0.013 mm
Repeatability per Stage	± 0.0001 Inches / 0.0025 mm*	± 0.0002 Inches / 0.005 mm
Repeatability - TIR	± 0.0001 Inches / 0.0025 mm*	± 0.0005 Inches / 0.013 mm
Repeatability Master Rotor	± 0.0001 Inches / 0.0025 mm*	± 0.0002 Inches / 0.005 mm
Measurement Time	5 Seconds or less	Up to 25 Seconds
Power Required	110 / 120 VAC, 50 / 60 Hz	110 / 120 VAC, 50 / 60 Hz
Operating Temperature	40 ^{0}F - 110 ^{0}F (4 ^{0}C - 40 ^{0}C)	40 ^{0}F - 110 ^{0}F (4 ^{0}C - 40 ^{0}C)
Specifications apply at	40 ^{0}F - 110 ^{0}F (4 ^{0}C - 40 ^{0}C)	70 ^{0}F ± 3 ^{0}F / 21 ^{0}C ± 2 ^{0}C
Temperature compensation	Yes	N / A
Humidity	90% Maximum non-condensing	90% Maximum non-condensing
Focused Laser Spot size	0.001 Inches X 0.003 Inches at probe focal point	0.005 inches diverging at measurement point

Laser Source	Pulsed Solid state Laser Diode, 680 nm - 695 nm, 35 mW maximum output power, CDRH certified Class IIIb Laser product	CW Helium - Neon gas laser, 632 nm, 2.5 mW maximum output power, CDRH certified Class II laser product

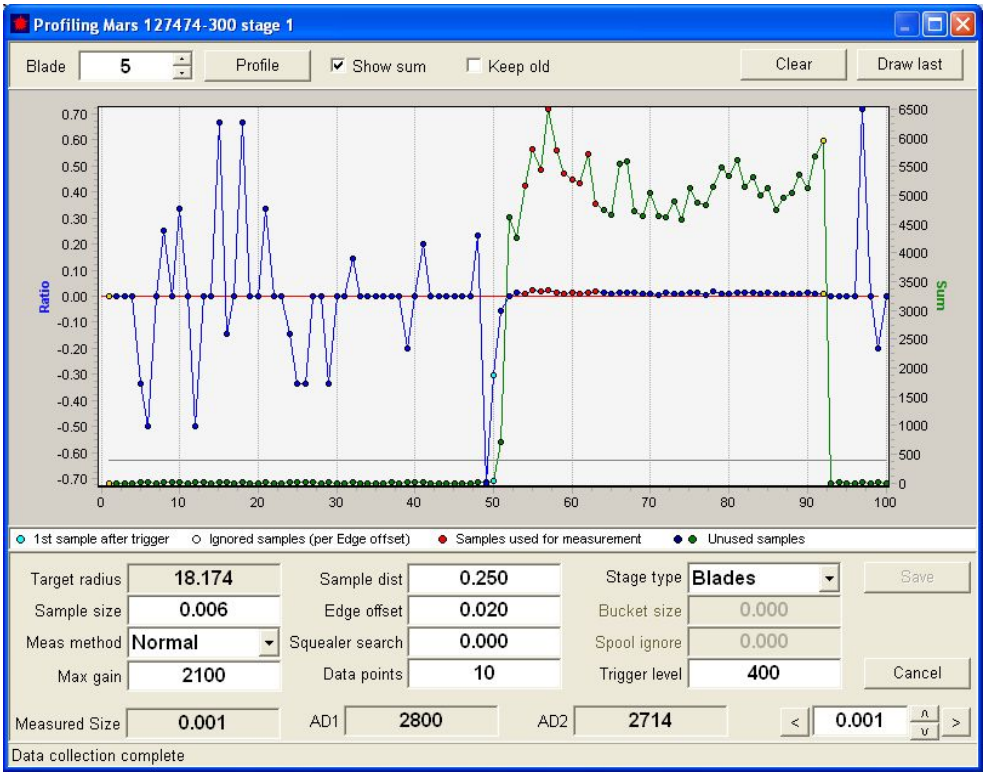
Using a significantly higher power laser diode as a light source we are able to overcome most surface finish issues that were a problem with the older model 81 gauges. We have doubled the laser safety features to prevent any unwanted laser emission from the laser gauge and we are in compliance with CDRH class IIIb product certification 21 CFR 1040.10 and 1040.11.

With the implementation of DSP technologies we are able to significantly increase the measurement speed, greatly reducing the cycle time, as a result increasing the through put of the grinding operation and at the same time improving the resulting accuracy of the

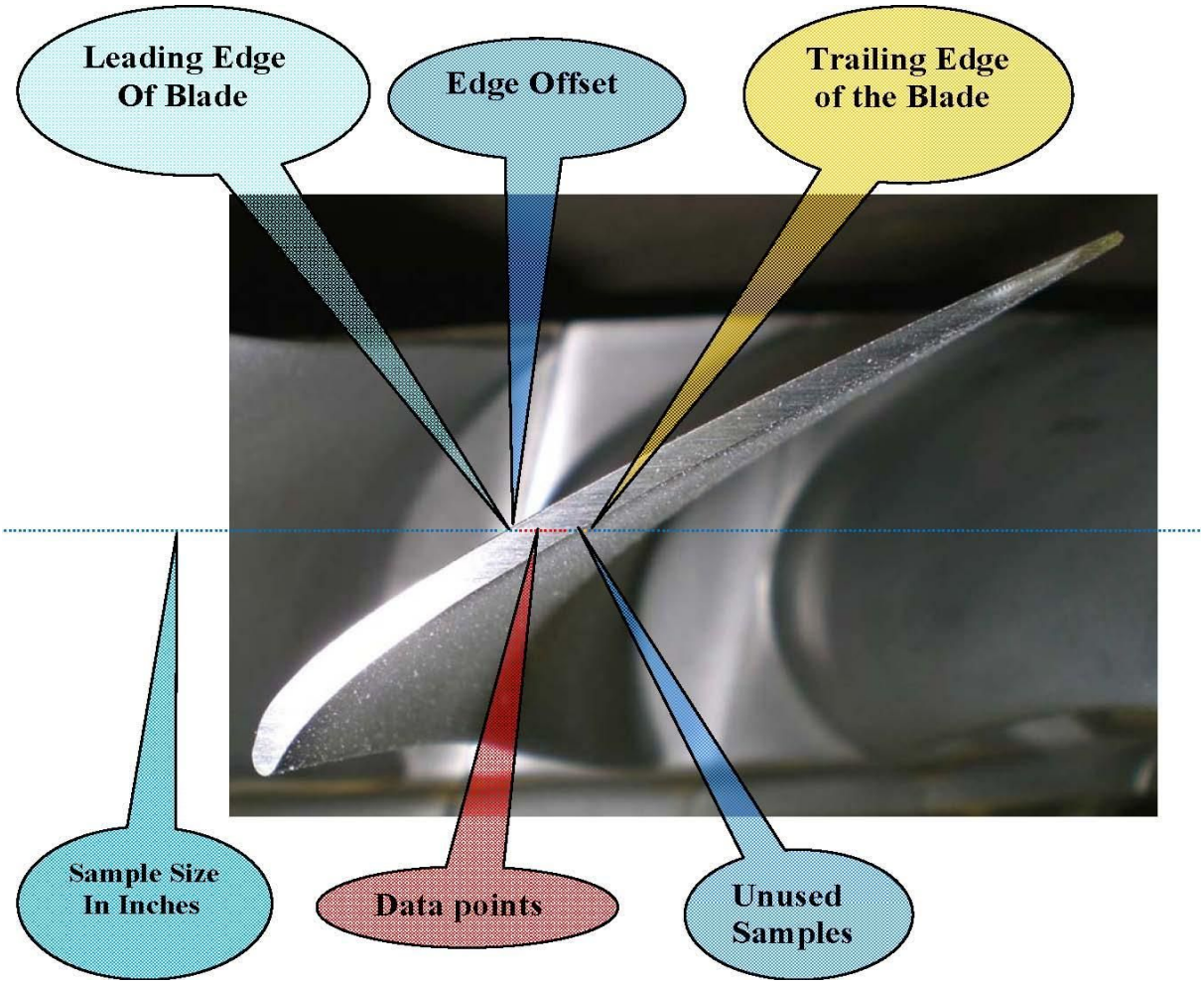
system. Another benefit of this technology is that you as the engineer of the process are able to select where you would like to take the samples over the blade tip ignoring any leading or trailing burrs that may develop during the grinding process. Elimination of the debarring process before measuring further improves the measurement process as the blade seating remains undisturbed prior to and during the measurement. Process time is further reduced by the fact that only one debarring process need be completed at the end of the grind cycle.

What you are looking at on a standard blade

This is our Profiling page where the measurement area of the blade tip is selected by the Engineer during the initial setup, this is a onetime setup procedure and is stored within the rotor tables and is recalled from memory every time the product part number is called up to run. This is a very powerful tool to be used by your staff to evaluate the product properly. With this tool we can eliminate the need to de-burr before the measurement is taken, there by greatly reducing the grind cycle time.

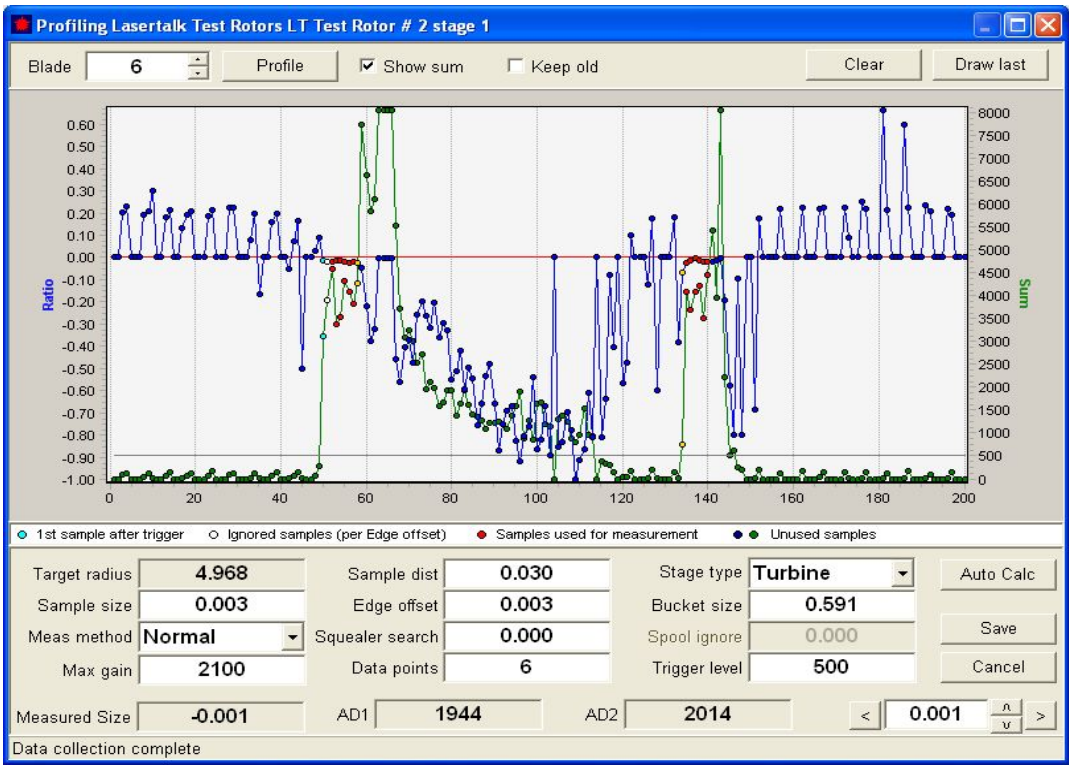


Direction of blade rotation

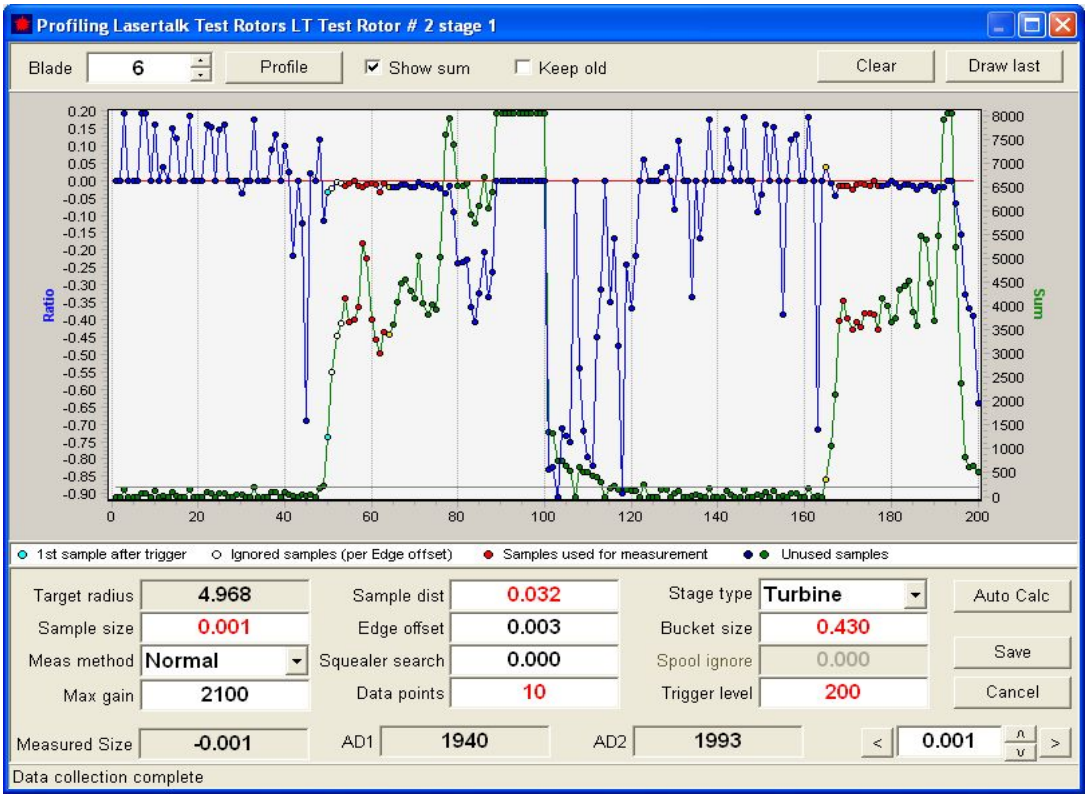


We have added measurement options for turbine / pocketed blade's, you now have the option of selecting the leading, trailing, or the average of both edges of the blades.

We have further enhanced the blade profiling tools of our software by making provisions to automatically calculate the needed parameters and at the same time giving the engineer to manually select the blade tip detail that they want to capture for the measurements.



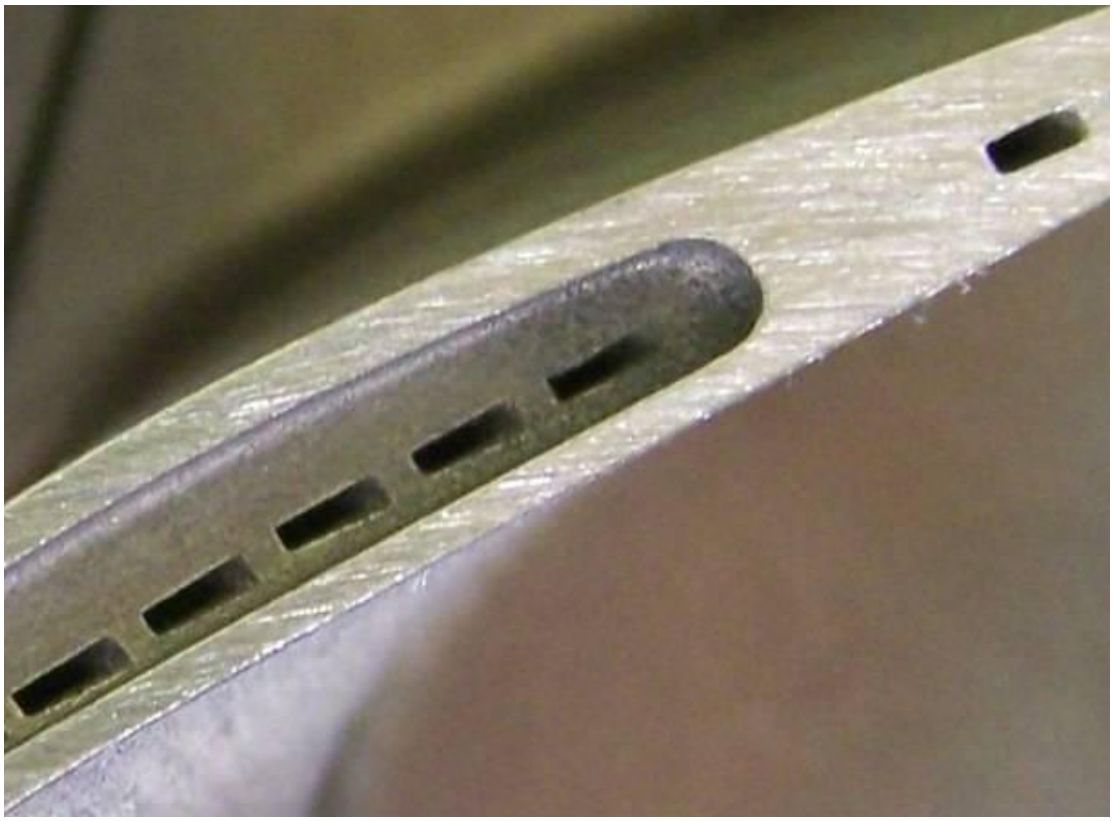
Before Auto calculation



After auto calculation

Trigger Level

Bucket size In Inches



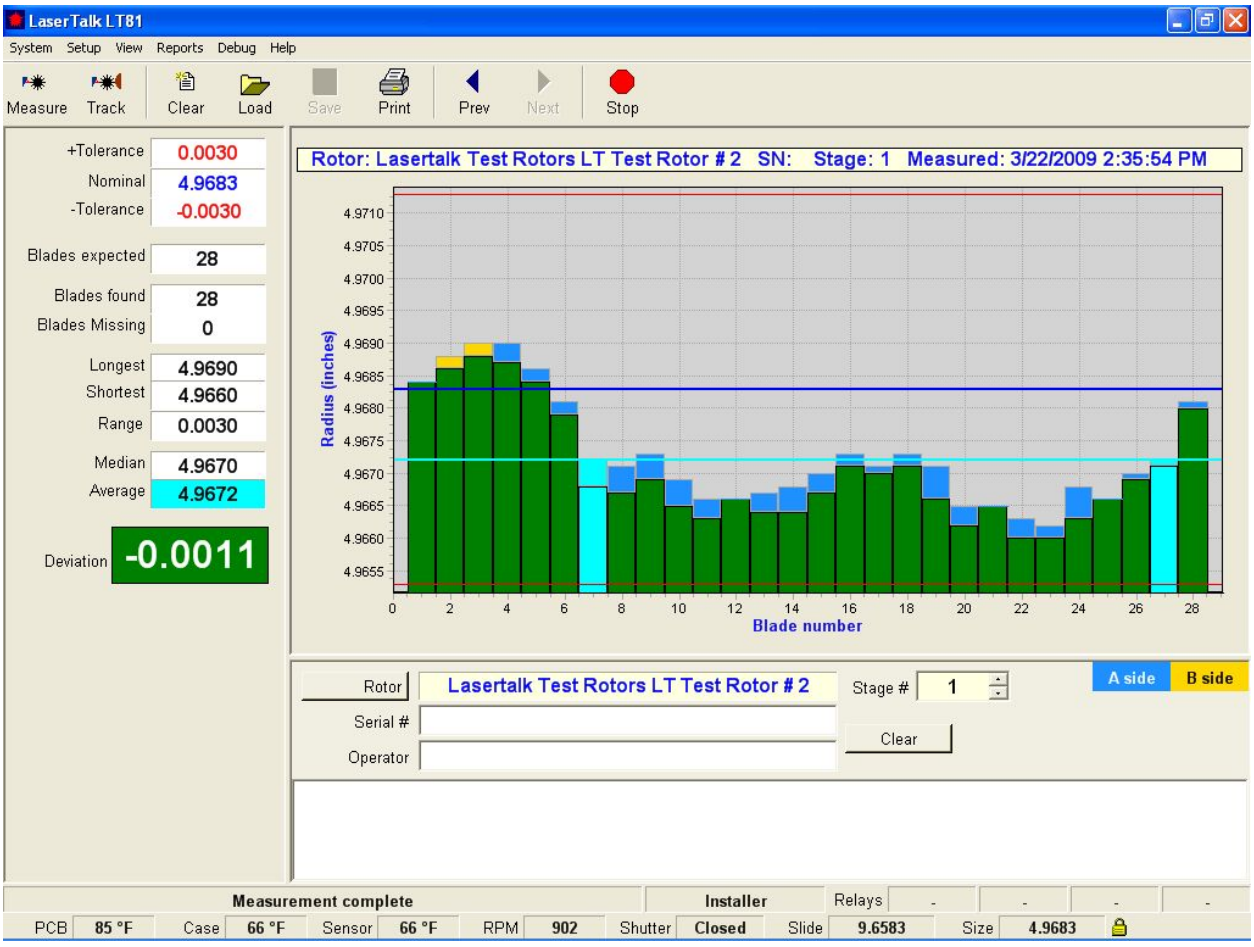
Sample Size in Inches

Data Points for side "B"

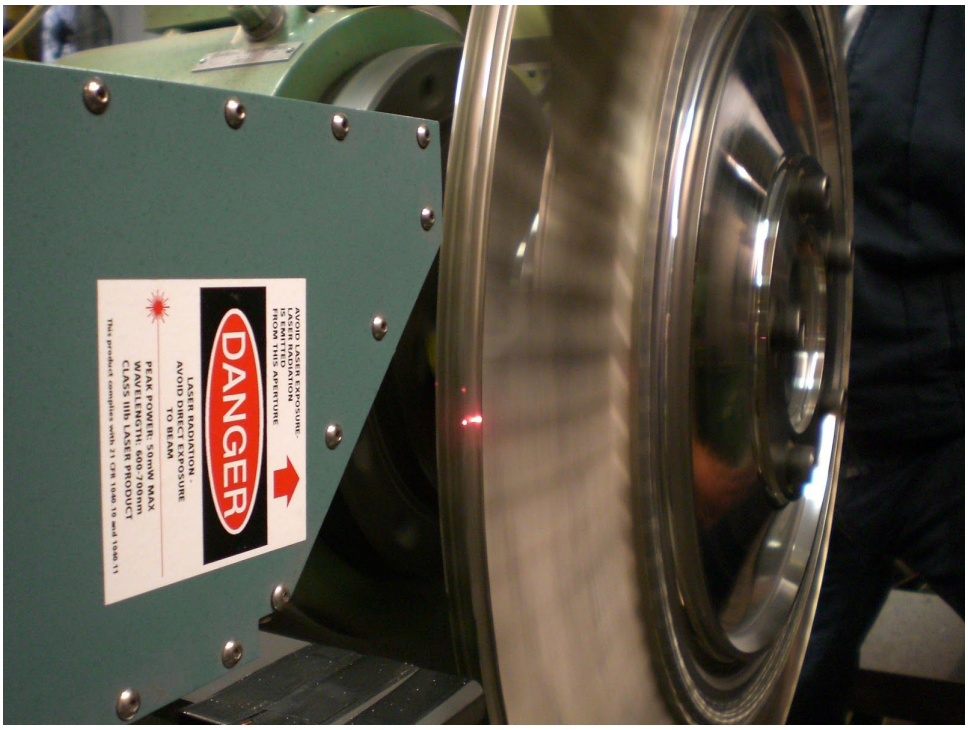
Edge Offset

Data Points for side "A"

Direction of blade rotation



With the incorporation of a very small laser spot size and having reduced the package profile we now have the capability to measure lands and seals where space permits. In addition we can now measure rotating seals / shrouded blades.

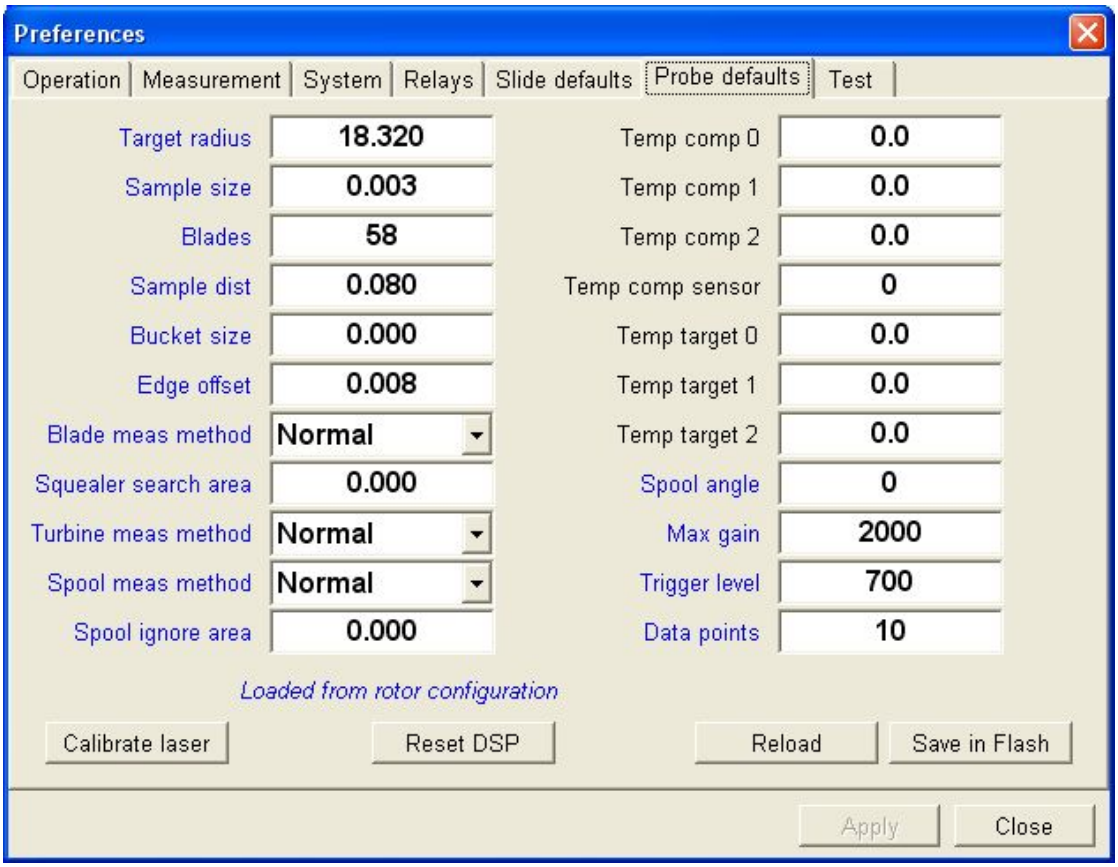


Measuring rotating seals / shrouded blades

Trying to comply with our customers request we have added a note / comment area for production notes to be added to the measurement report and to follow the report to the archived storage of the measured product.

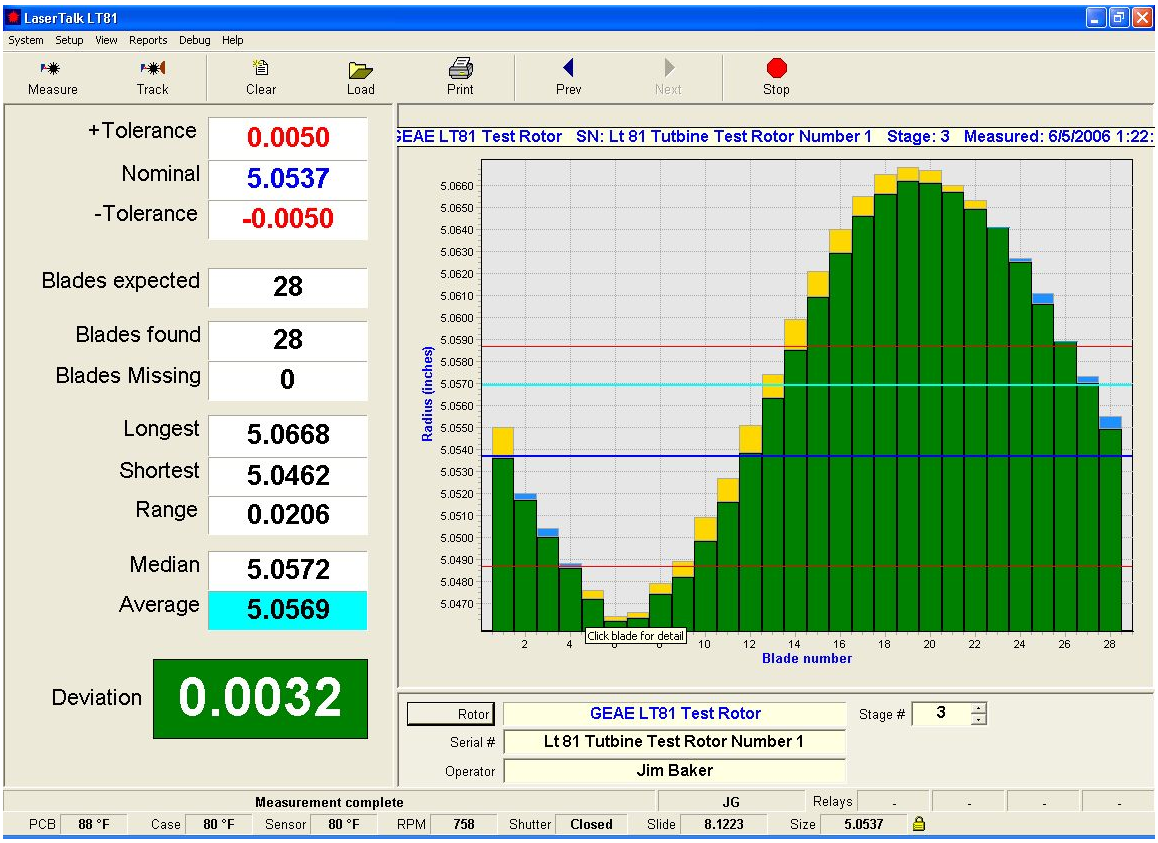
Using a propriety optical design we are able to minimize any optical reflections that would radiate from the product under test that would otherwise affect the measuring process.

In an effort to eliminate a concern with the older laser gauge we have incorporated temperature compensation into the design of the laser gauge, when this feature is setup and activated the temperature coefficient of the system is so low that we have not been able to measure it.



We have incorporated three temperature sensors in the design of the laser probe one in the optical block assembly, the second is embedded in the electronics, and the third is to monitor the temperature of the probe housing. Our testing has indicated that the greatest change in the readings with respect to temperature is caused by the probe housing. If we chose to activate the automatic compensation we would select that sensor to control the compensation.

This system provides an inherit ability to detect “Total indicated run out” from our main display screen at a glance when looking at the bar graph section of the display screen. As indicated by the sin wave of the bar graph.



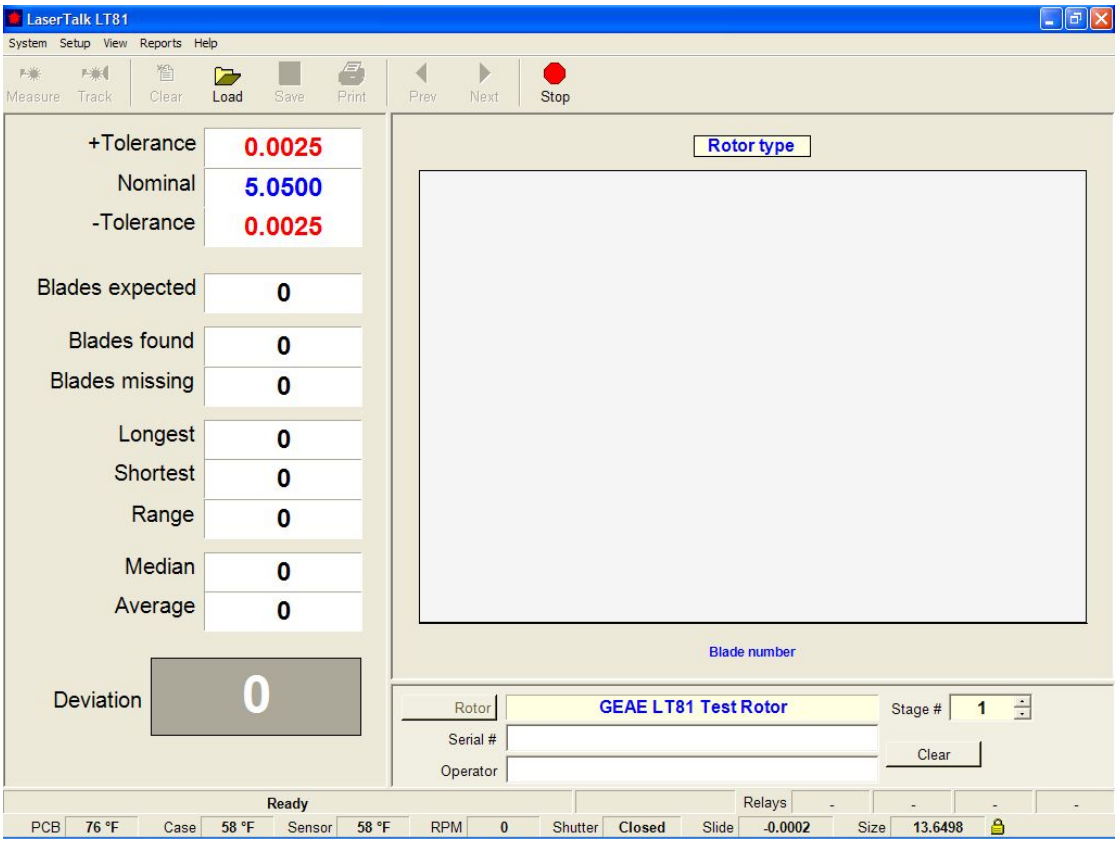
This display page view illustrates what a typical TIR indication will look like, notice the Sin wave shape outline.

Improved Operation

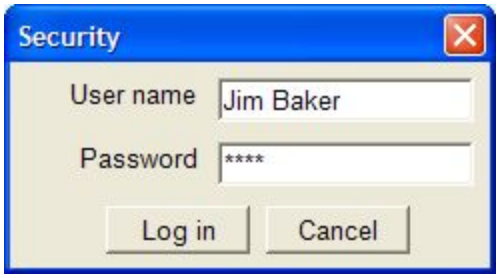
User friendly Windows XP-based interface and control program

Our user interface is a standard PC allowing us to utilize the flexibility of the windows interface for the control of the process and provide your operators the familiarity of the operation and navigation through our powerful software.

- At power on before any action can take place the operator must log on to verify operational access to the system.

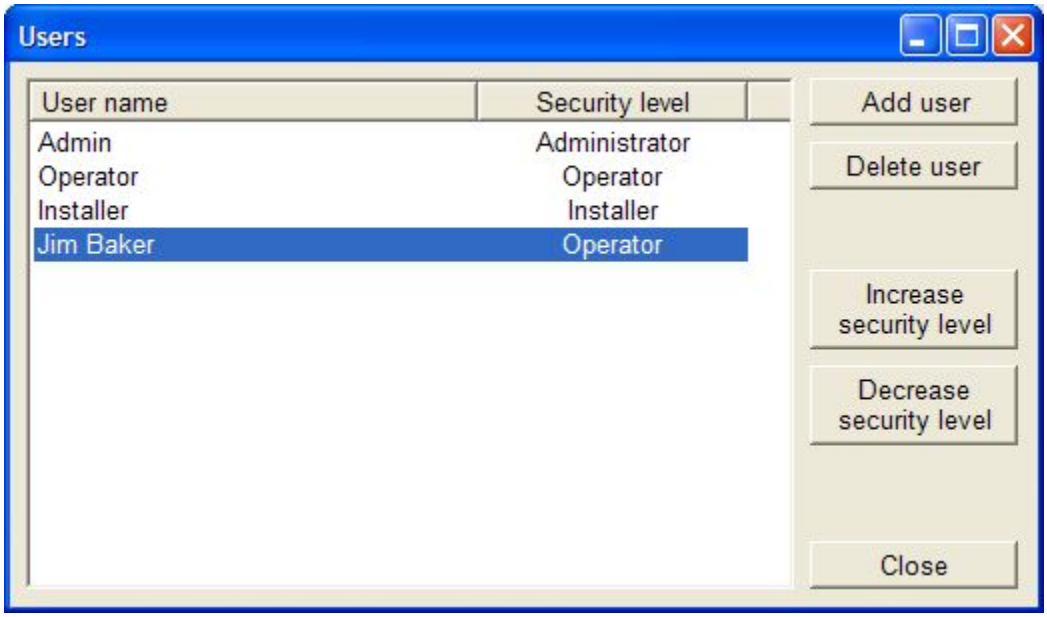


To log on one must select the SYSTEM tab then select USER, then the LOG IN



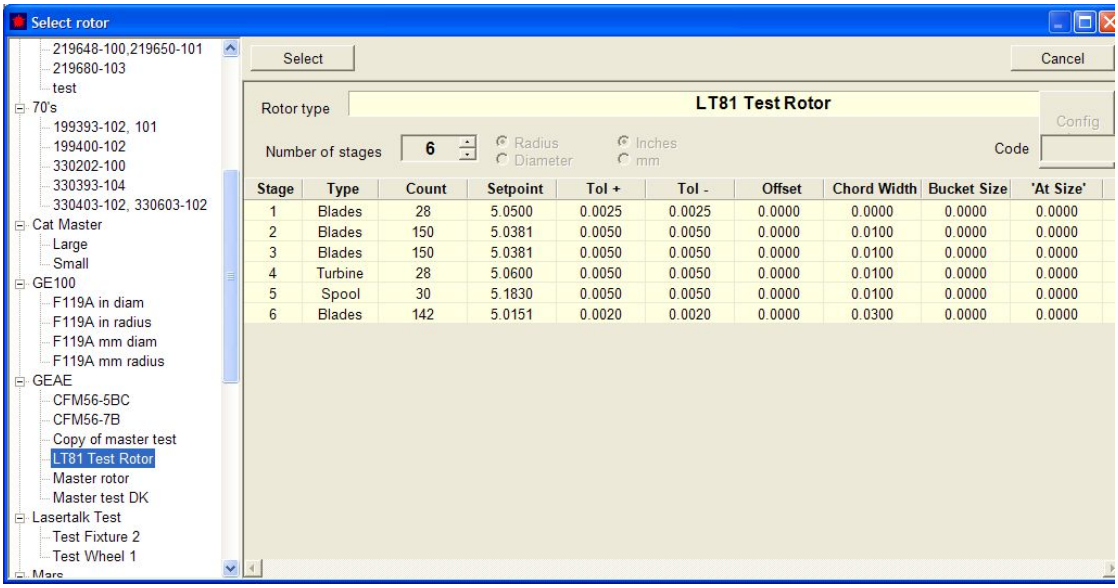
- **Multiple security levels**

    a. There are three levels of security each controlling various levels of access to the software operations.
        - The first and most used level is the operator; this level provides access to all of the necessary functions that is necessary for the normal operation of the system for day to day operation.
        - The second is administrator; this level allows access to all functions needed to set up the system rotors and various programming / diagnostic functions.
        - The third is the installer; this level is used during the installation to set up the machine interface parameters for the system installation.



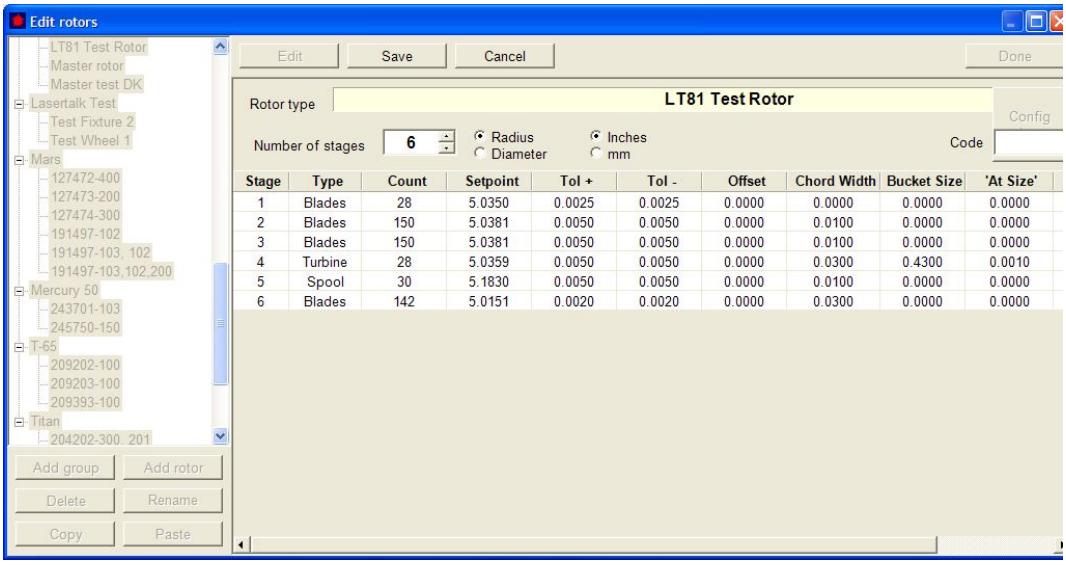
Managing user screen page

When the user is logged in and ready to run a given rotor, they select the proper rotor type by there standard process be it by loading a floppy disk, selecting from the library, or via a remote host PLC by assigning a CODE number from the PLC program. The library capacity is virtually unlimited with the ability to organize into families.



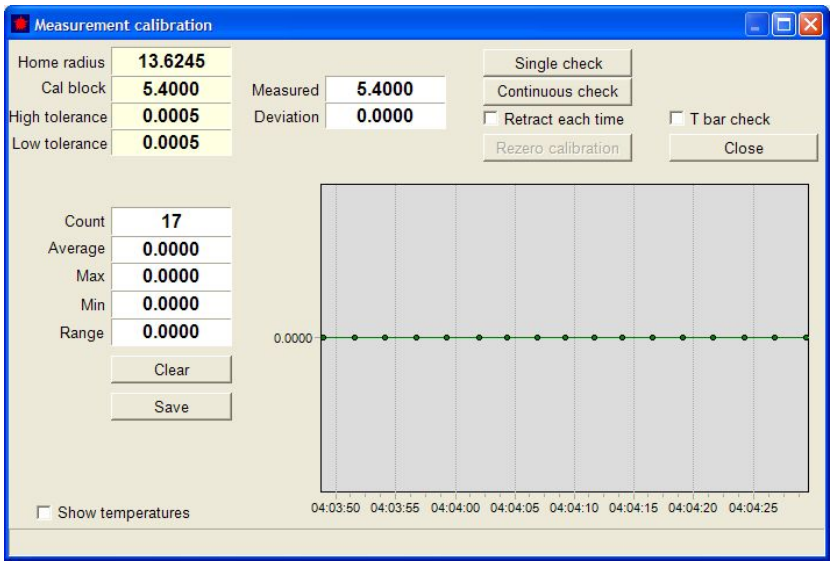
Stage	Type	Count	Setpoint	Tol +	Tol -	Offset	Chord Width	Bucket Size	'At Size'
1	Blades	28	5.0500	0.0025	0.0025	0.0000	0.0000	0.0000	0.0000
2	Blades	150	5.0381	0.0050	0.0050	0.0000	0.0100	0.0000	0.0000
3	Blades	150	5.0381	0.0050	0.0050	0.0000	0.0100	0.0000	0.0000
4	Turbine	28	5.0600	0.0050	0.0050	0.0000	0.0100	0.0000	0.0000
5	Spool	30	5.1830	0.0050	0.0050	0.0000	0.0100	0.0000	0.0000
6	Blades	142	5.0151	0.0020	0.0020	0.0000	0.0300	0.0000	0.0000

- **Simple and automatic conversions from mm to inch and/or radius to diameter**



When in the edit pages of the setup you can select radius or diameter simply by checking the desired parameter. The same holds true with Millimeter or Inch units of measurement. When you change a given function all of the settings for this rotor table will be changed automatically and at the same time with no calculating from the operator.

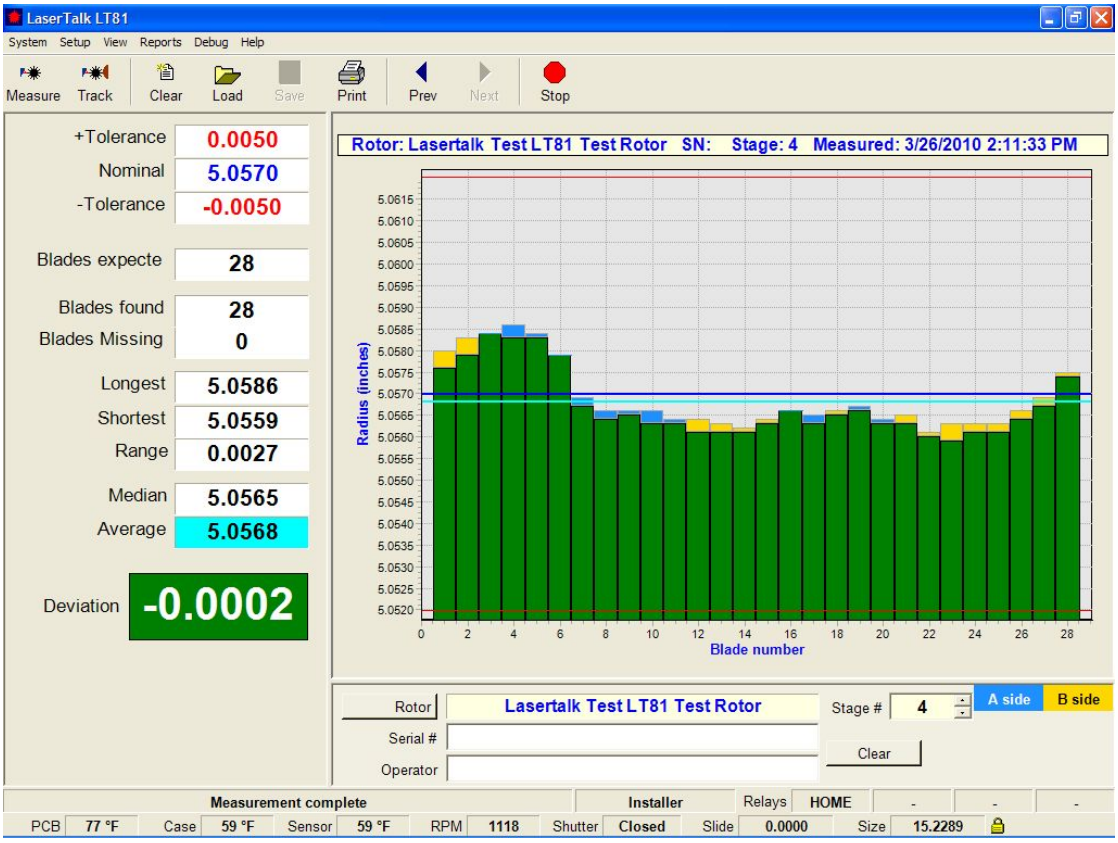
When you have selected the proper rotor for the product to grind and have preformed all of the production preparation, and are ready for a measurement the first step is to do a calibration of the laser gauge.

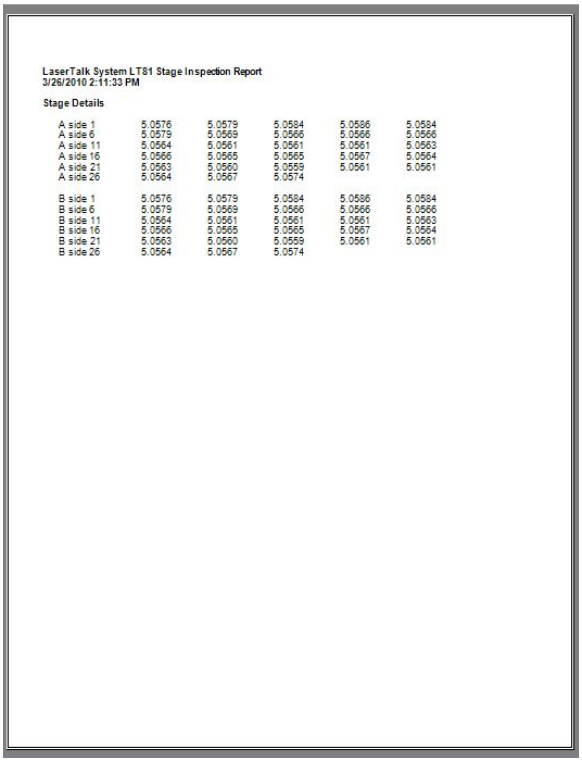


Calibration display page depicting 17 continuous calibration readings on the calibration block, note the measurement stability of the readings.

- **Results printed to local or networked Windows printer**

Up on completion of a measurement the measured data is saved and sent to a file for retrieval at a later time be it for the operator to review, to be printed for production requirements, or for archive storage for process requirements, all of this is on the system computer. The date can also be sent out to a local area network to be integrated into the plants data system.

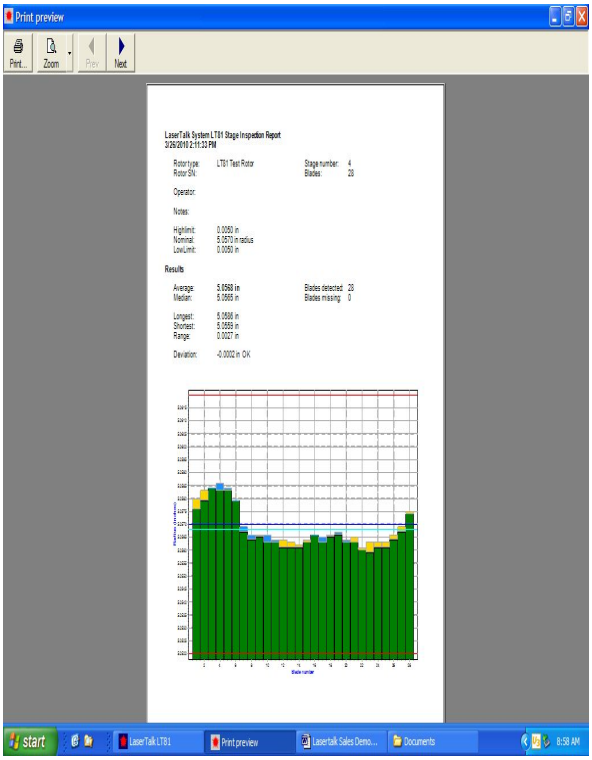




LaserTalk System LT81 Stage Inspection Report
3/26/2010 2:11:33 PM

Stage Details

A side 1	5.0576	5.0579	5.0584	5.0586	5.0584
A side 6	5.0579	5.0569	5.0566	5.0566	5.0566
A side 11	5.0564	5.0561	5.0561	5.0561	5.0563
A side 16	5.0566	5.0565	5.0565	5.0567	5.0564
A side 21	5.0563	5.0560	5.0559	5.0561	5.0561
A side 26	5.0564	5.0567	5.0574		
B side 1	5.0576	5.0579	5.0584	5.0586	5.0584
B side 6	5.0579	5.0569	5.0566	5.0566	5.0566
B side 11	5.0564	5.0561	5.0561	5.0561	5.0563
B side 16	5.0566	5.0565	5.0565	5.0567	5.0564
B side 21	5.0563	5.0560	5.0559	5.0561	5.0561
B side 26	5.0564	5.0567	5.0574		

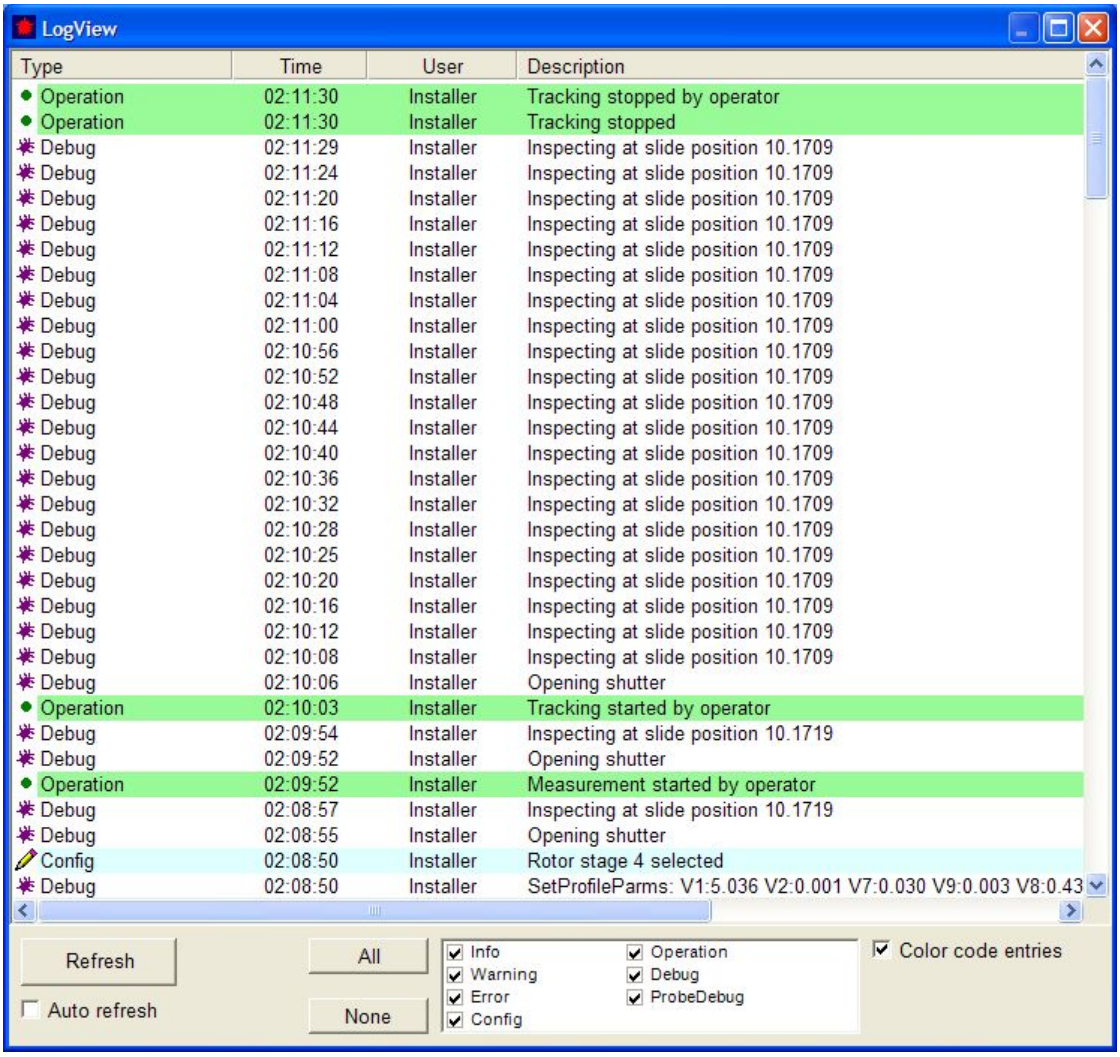


- **Results exported to Excel or XML formats for remote access and archiving**

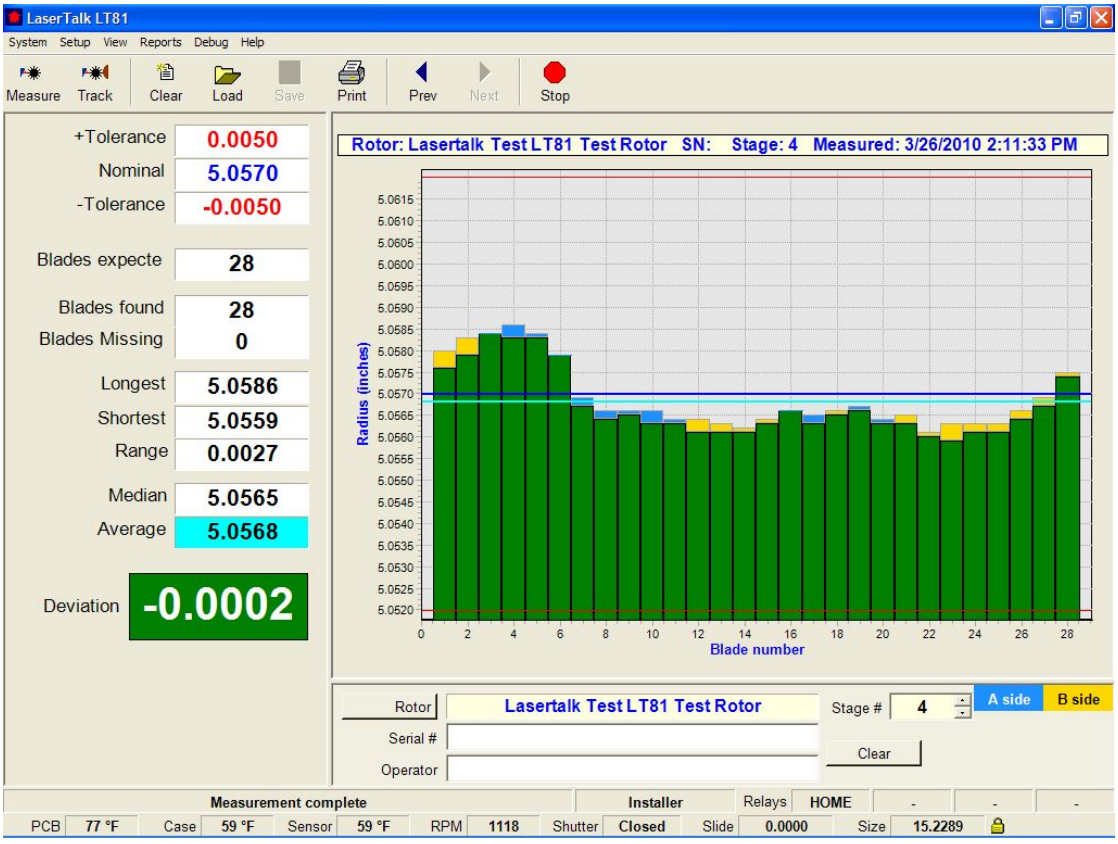
The measurement results can also be exported to Excl or XML formats for archiving, transmitting to other computer systems or for graphing.

- **Automatic logging of operation or setup events**

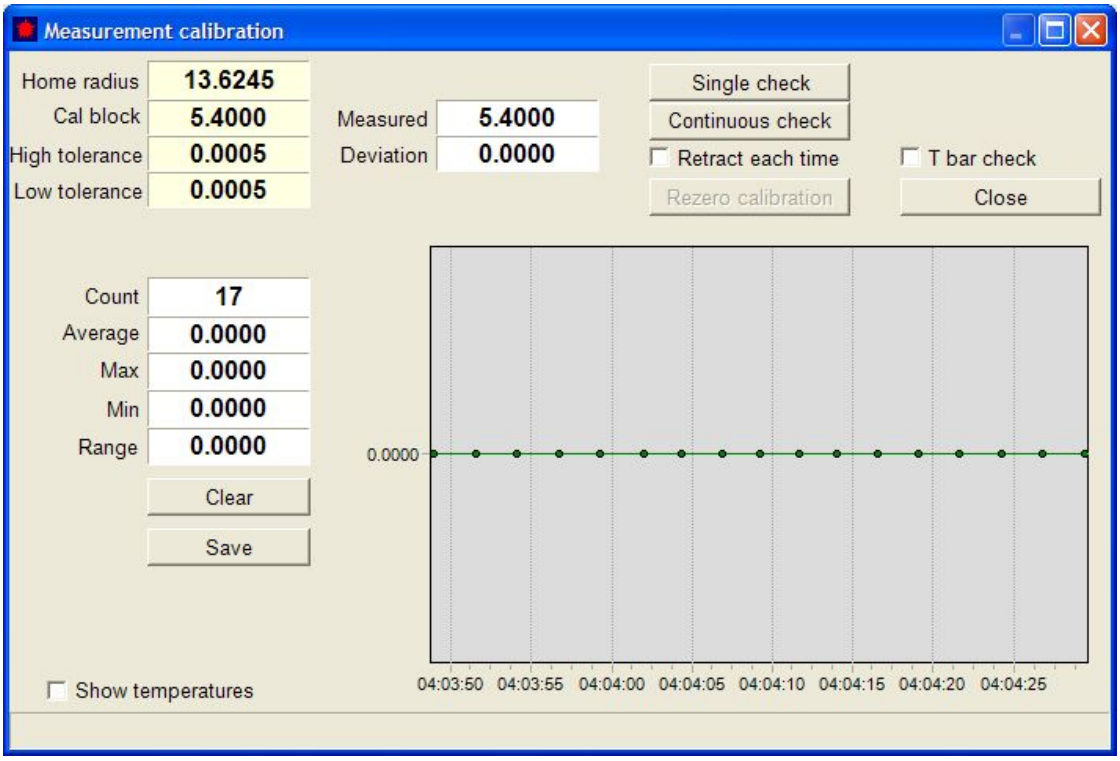
You will find built into the system an event log that record all of the operations that the system is performing.



- **Graphic display of measurement results**



- **Built-in test and diagnostics features**
- **Built in Operator's Manual**
- **Be prepared this system will tell you things about your process that were not possible with the older system**


Measurement calibration
Home radius
13.6245
Cal block
5.4000
High tolerance
0.0005
Low tolerance
0.0005
Measured
5.4000
Deviation
0.0000
Single check
Continuous check
Retract each time
T bar check
Rezero calibration
Close
Count
17
Average
0.0000
Max
0.0000
Min
0.0000
Range
0.0000
Clear
Save
0.0000
04:03:50
04:03:55
04:04:00
04:04:05
04:04:10
04:04:15
04:04:20
04:04:25
Show temperatures