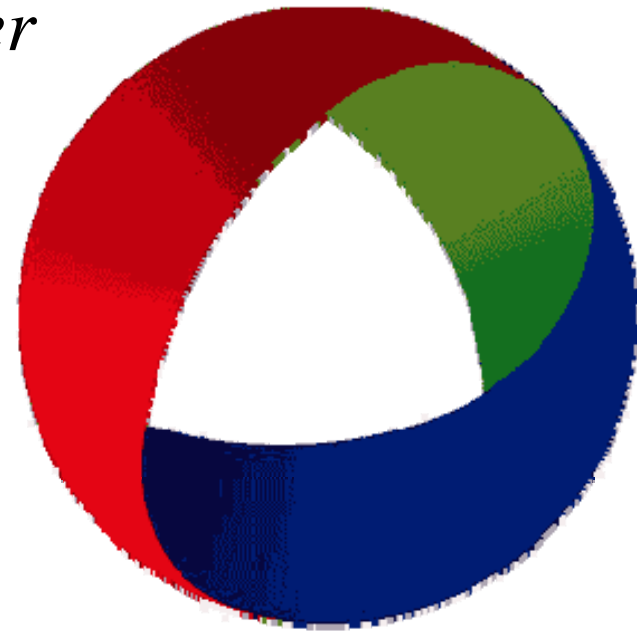


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*Waltham, MA*



*Bridge Pin Inspection utilizing Phased Array*

# *Around the Equipment*



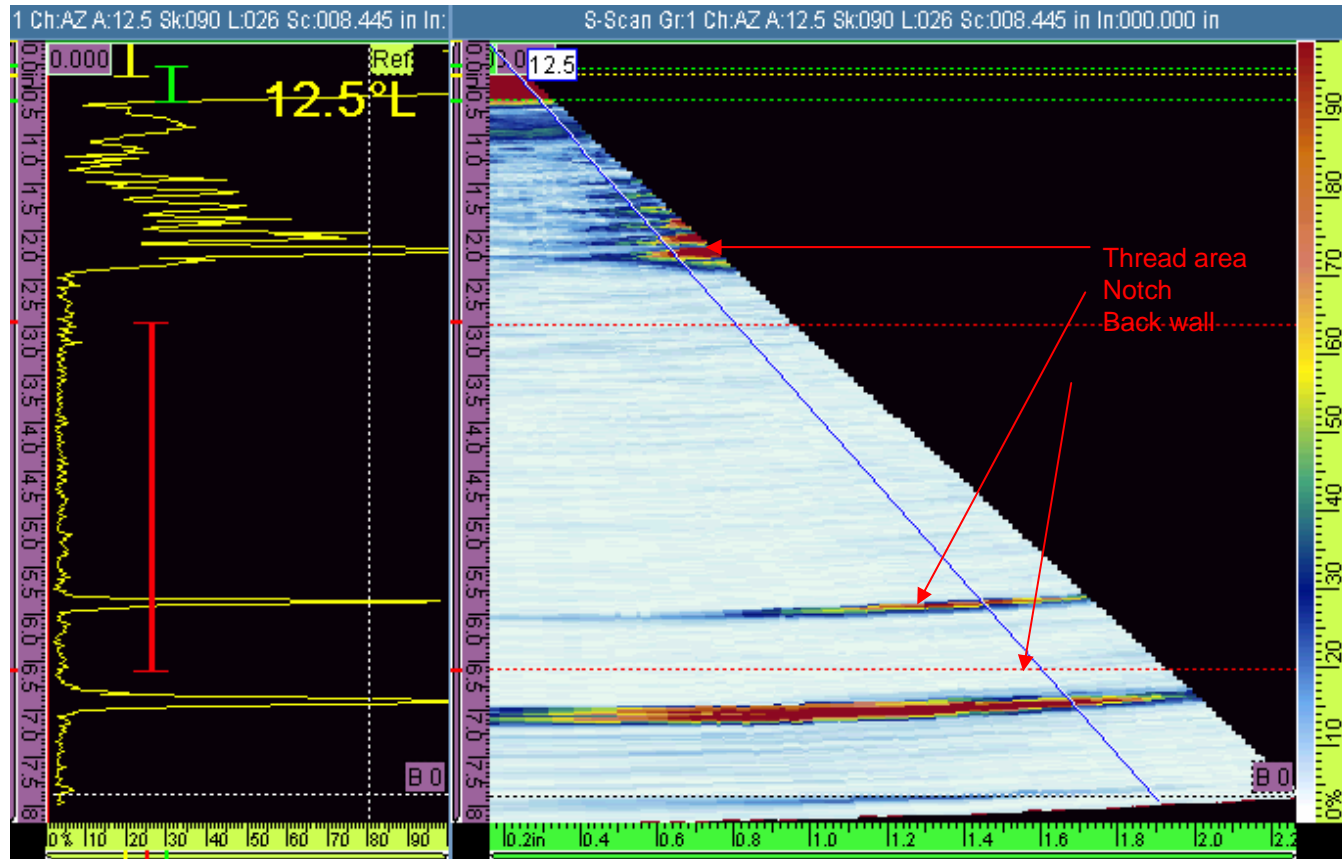
# *Around the Equipment*



# *Around the Equipment*



# Bridge Pin Inspection utilizing Phased Arrays



# Overview

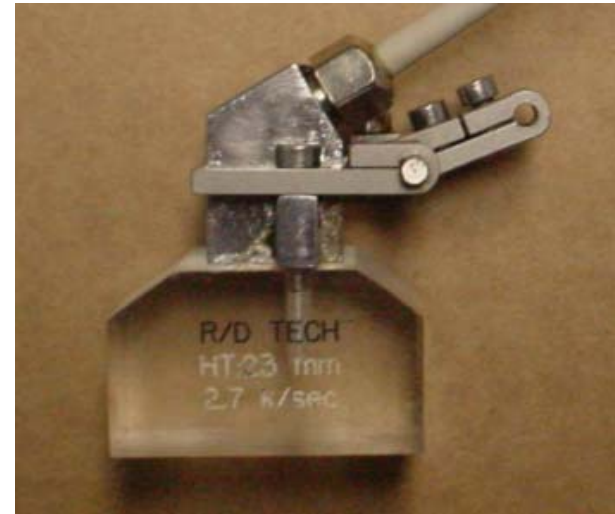
*Using the Omniscan MX PA and standard probes, an inspection using a 0-15 degree longitudinal sector scan was performed providing a full volumetric inspection of the 9.25 inch threaded bolt sample. This includes the body and threaded areas. The inspection assumed that access was available from both sides.*



# Equipment Utilized



***R/D Tech Omniscan Phased Array Instrumentation***



***R/D Tech 5L16 Phased Array Probe (5 MHz, .6mm element pitch)***



# Setup & Calibration

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The **setup** consists of a 0-15 degree longitudinal sector scan. All focal laws were focused at 4 inches. Dividing the inspection into 2 zones allows easy detection of all 10 defects in the sample provided.

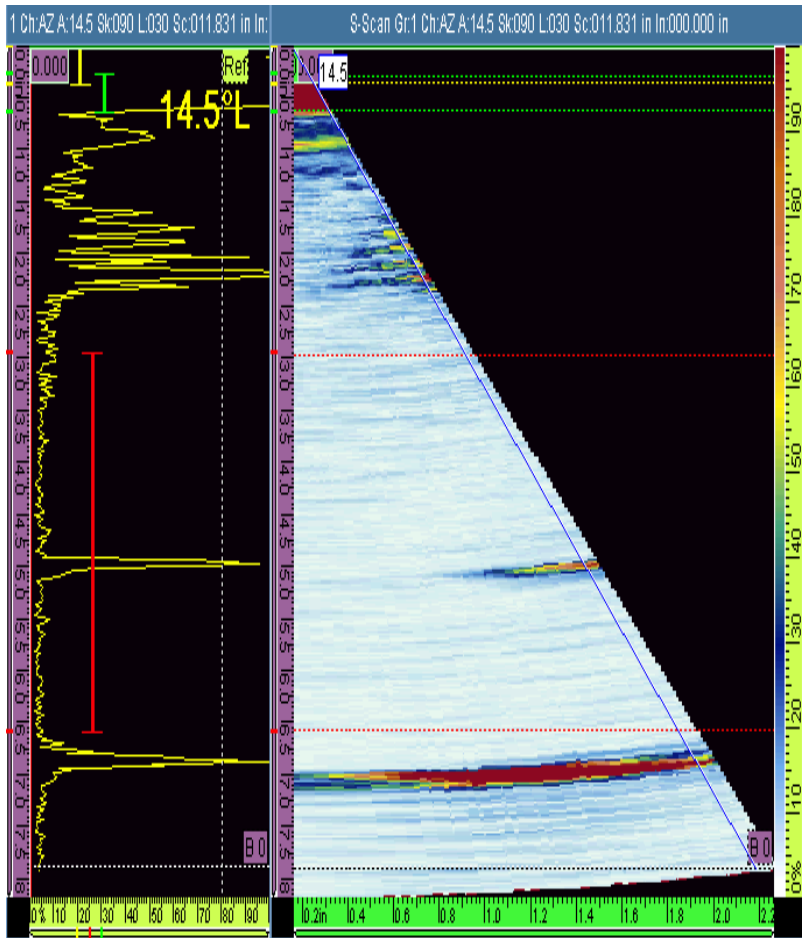
One zone was created for the body (non-threaded) area and one zone for the threaded area on the near side. The only difference between the set up for the two zones were adjustments to the range and gain to account for the longer sound path. This is a manual inspection.

Moving the probe back and forth and side to side a full volumetric inspection can be achieved from either side. Care must be taken to maneuver the probe around the retaining pin hole to ensure complete coverage. The 15 degree sector scan allows you to steer the beam under this obstruction.

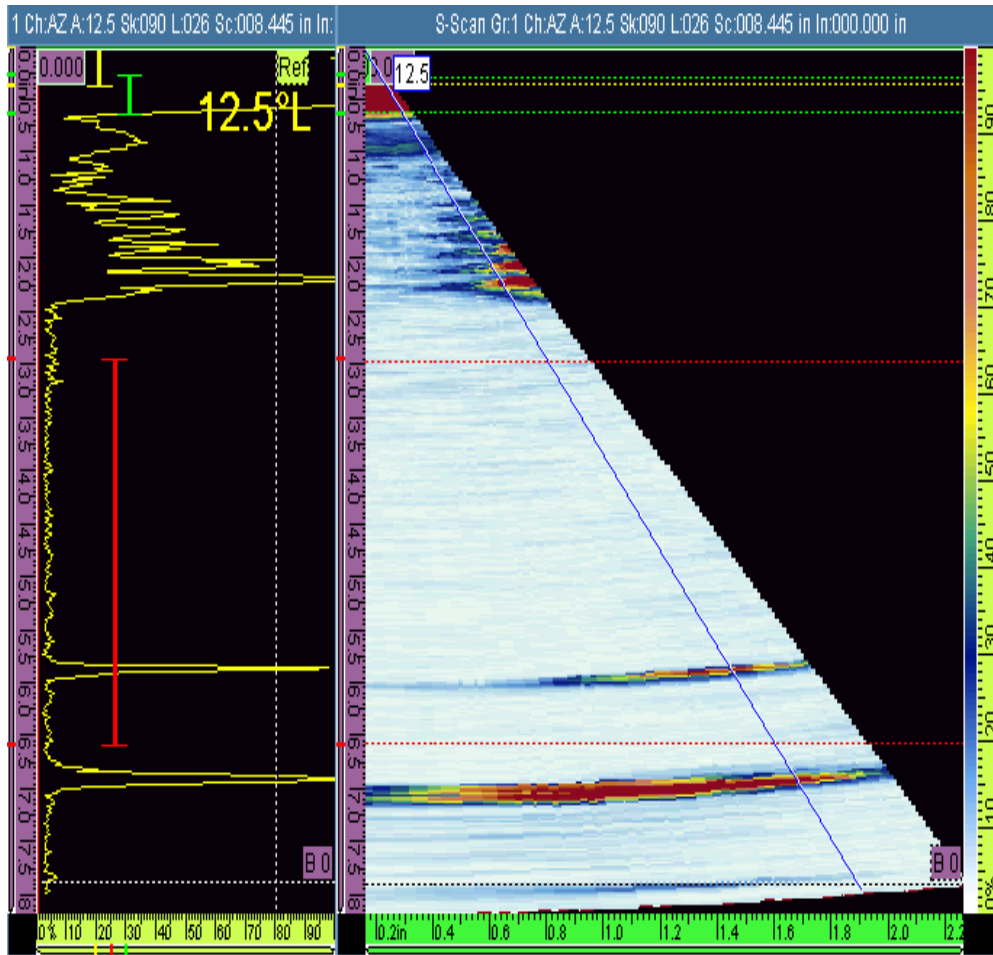
**Calibration** was performed by adjusting the gain on defect number 6 to 80%. Formal qualification of a procedure to the reference standard can be performed using a DAC or TCG but will require the same size notches placed into the part at different depths. This will allow for consistent sensitivity throughout the body and threaded areas.



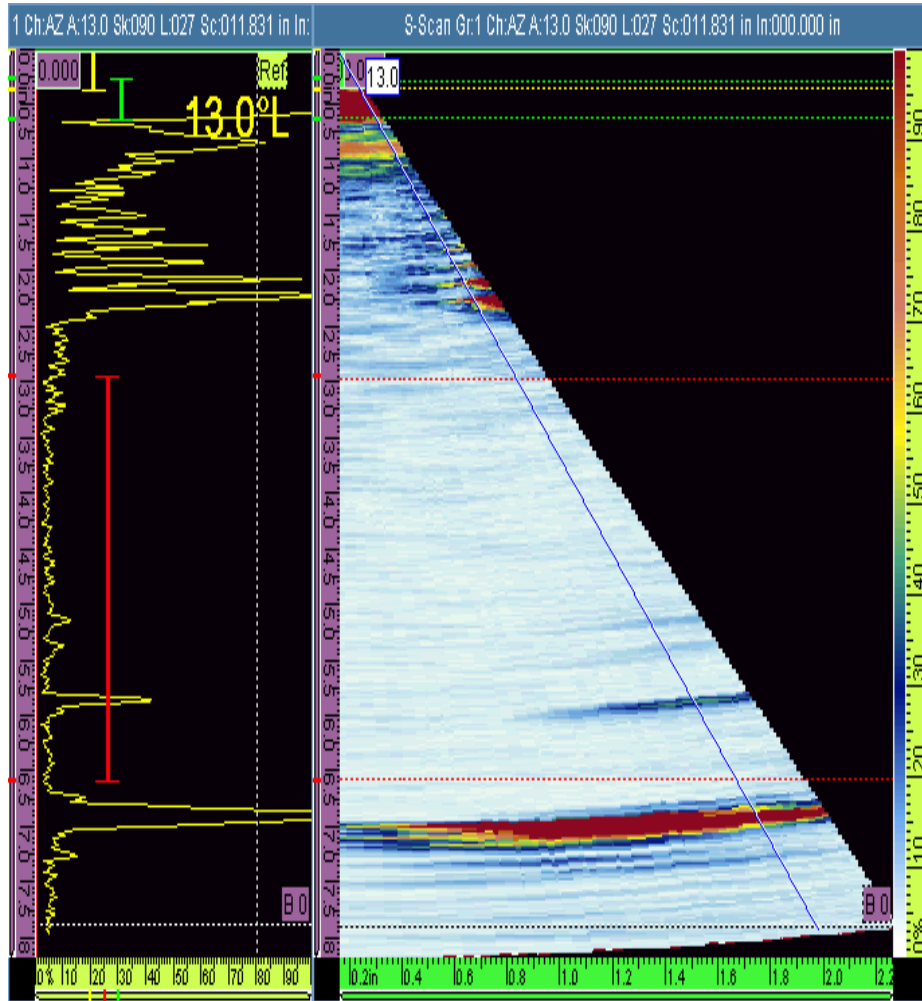
# Notch 1



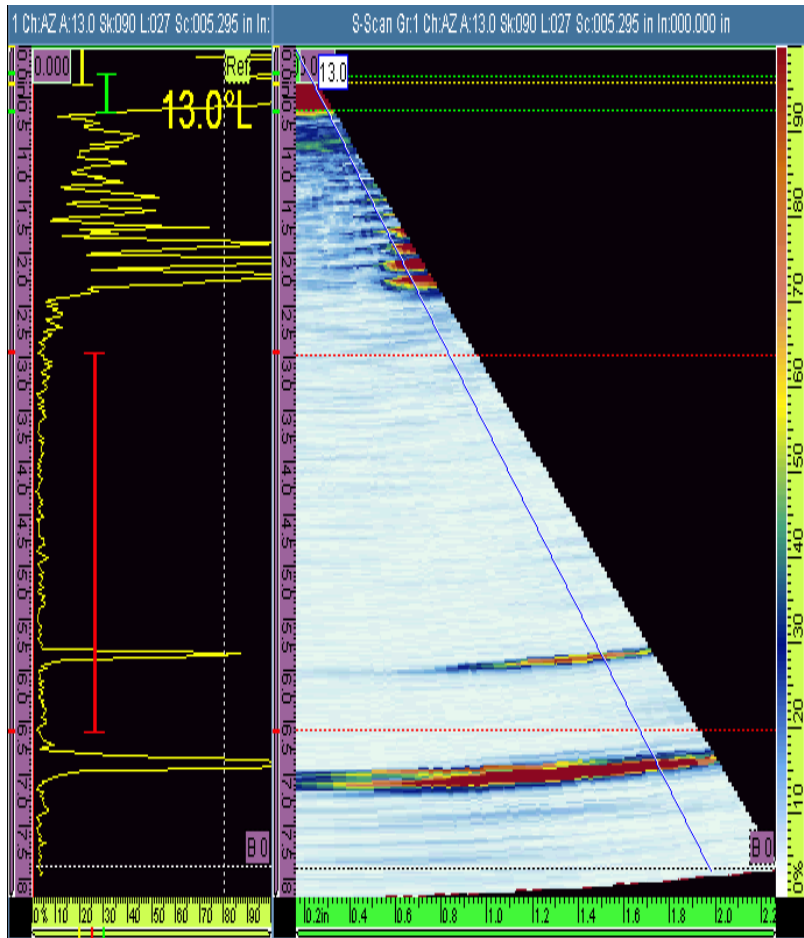
# Notch 2



# Notch 3

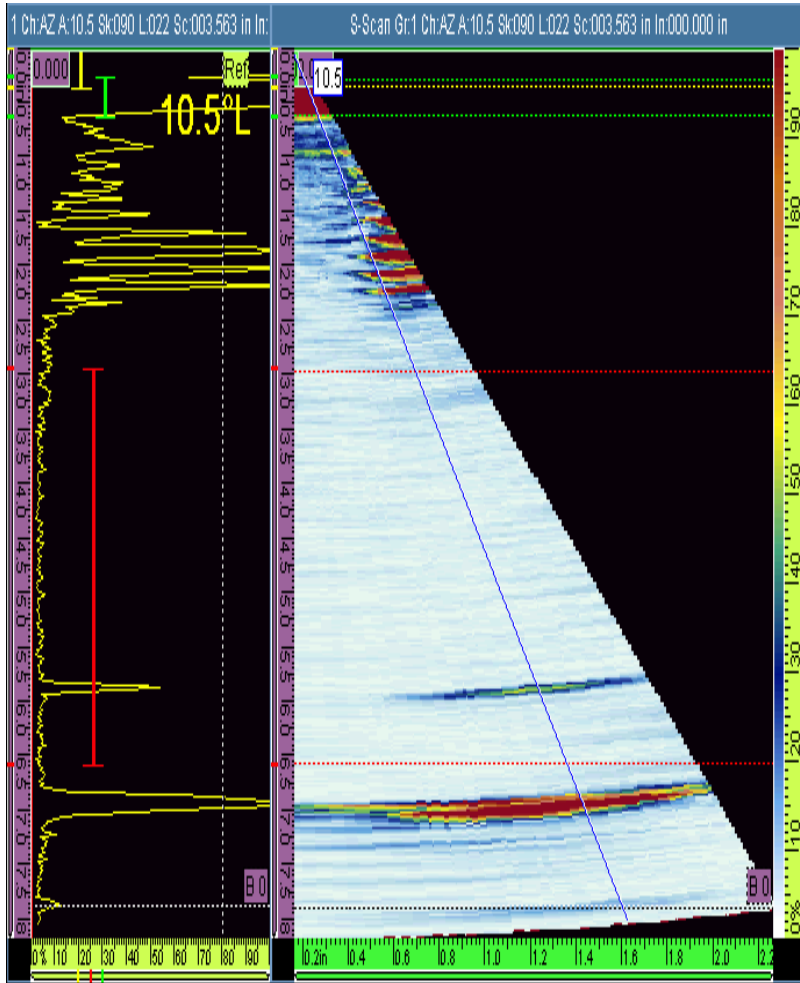


# Notch 4

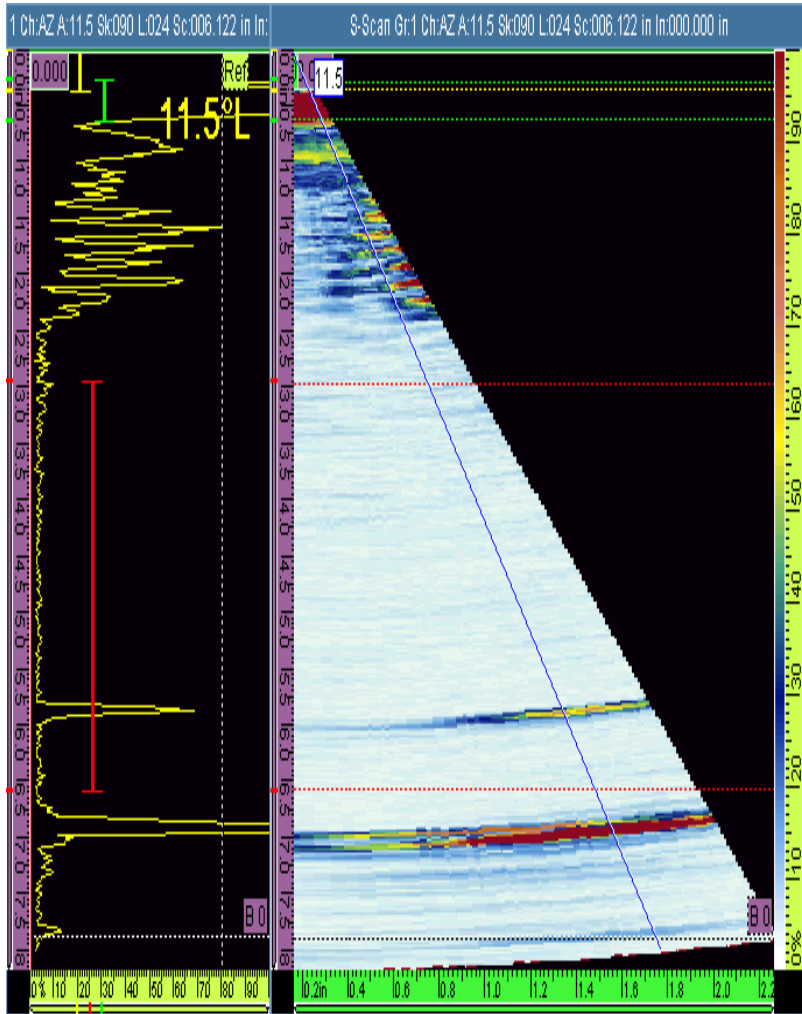




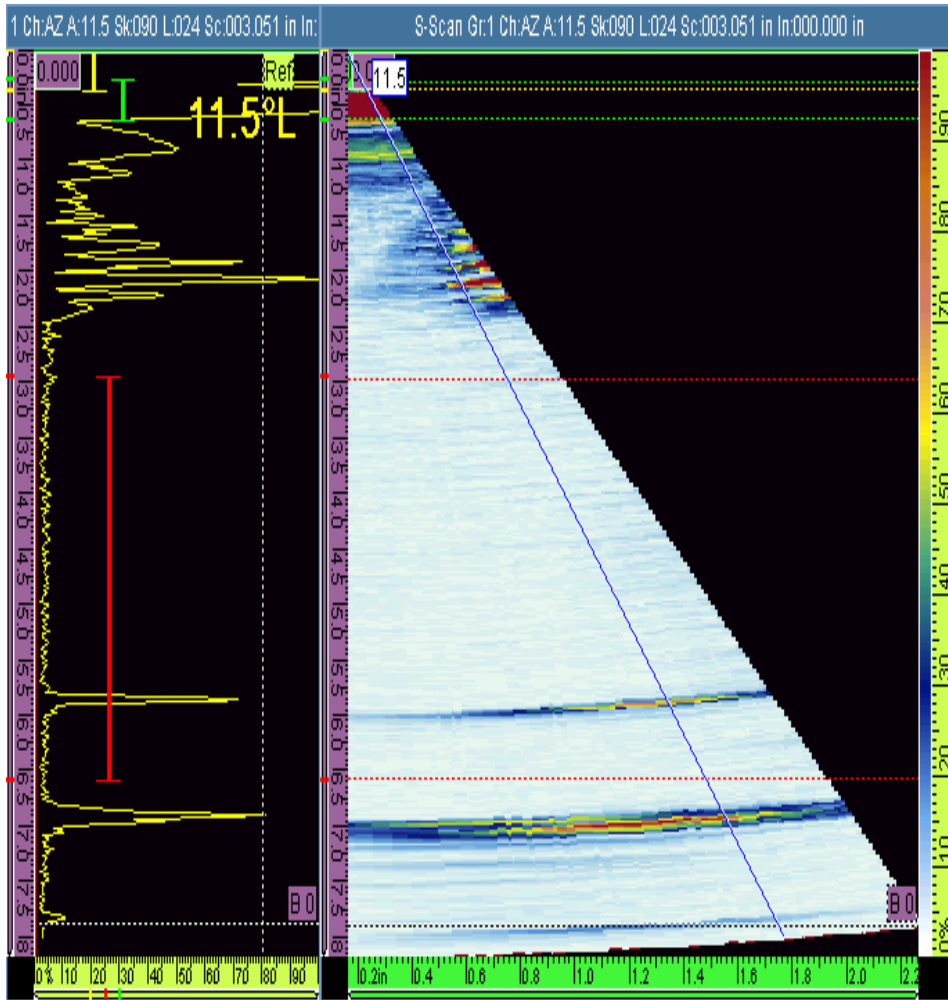
# Notch 5



# Notch 6

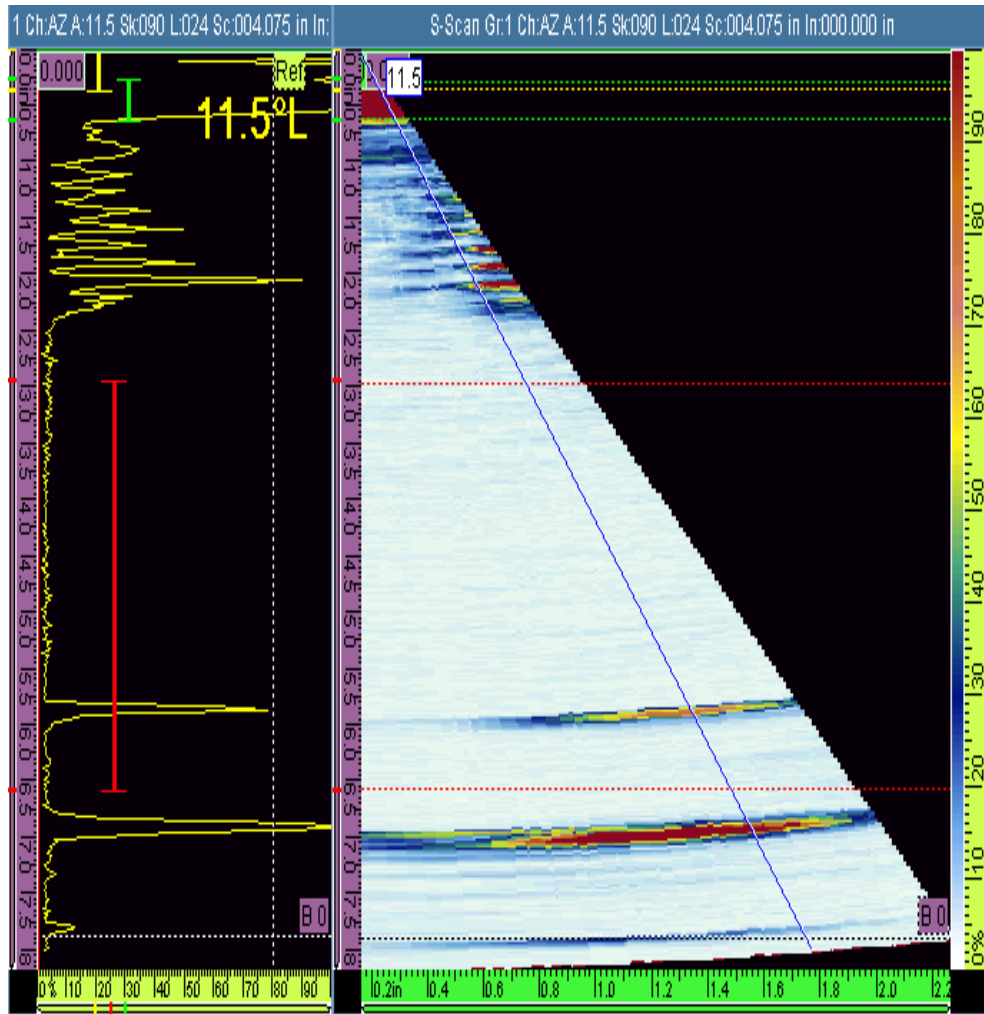


# Notch 7

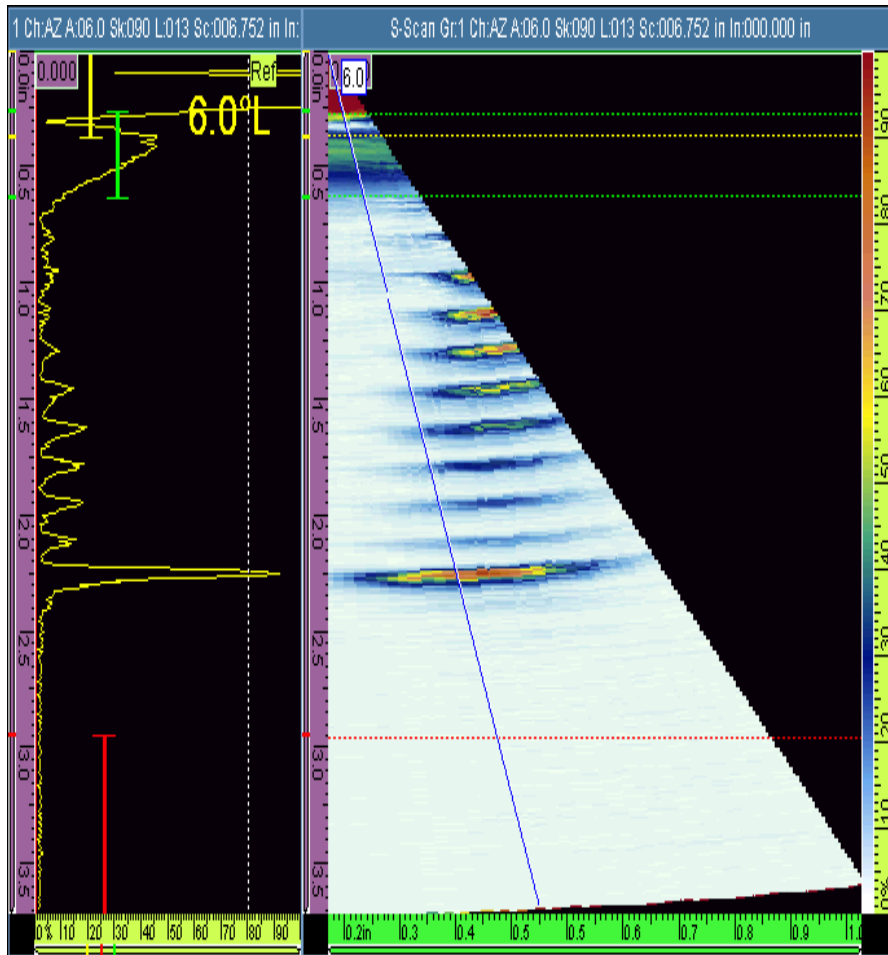




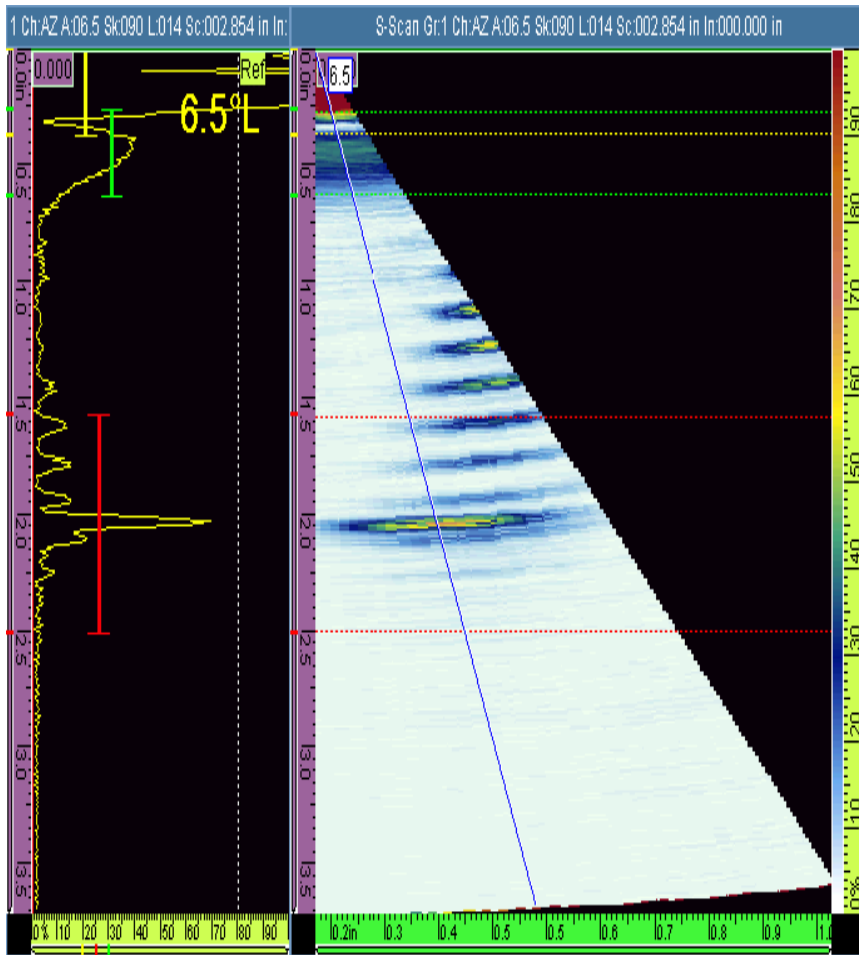
# Notch 8



# Notch 9 – in threaded area



# Notch 10 – in threaded area



# Data Storage

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- ***All set up files, data files, screen captures and reports are recorded on standard commercially available Compact Flash cards that can be purchased in sizes up to 4 gigabytes.***
- ***These cards can be easily transferred between instruments and computers to recall data, set up files and reports. The data files for this inspection were approximately 20 megabytes each.***
- ***Since this is a manual inspection and does not use an encoder. Data storage for off line analysis will be limited to screen captures. See results section.***

# Conclusion

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- ***This is a typical Omniscan application and can be performed with the standard probes. In fact with the use of a DAC or TCG we could have performed the inspection on much smaller defects and potentially larger length pins.***
- ***The advantages are speed, less dependence on the skill of the inspector for flaw detection and sizing, and the ability to store and recall data, and create detailed reports that include the phased array images and statistics.***
- ***Training on this application for a level II UT inspector would be 1 day of general phased array basics, and 1 day of application specific practice.***
- ***The Omniscan is very similar to a conventional digital flaw detector once the inspector has an understanding of the phased array components and how they are managed.***