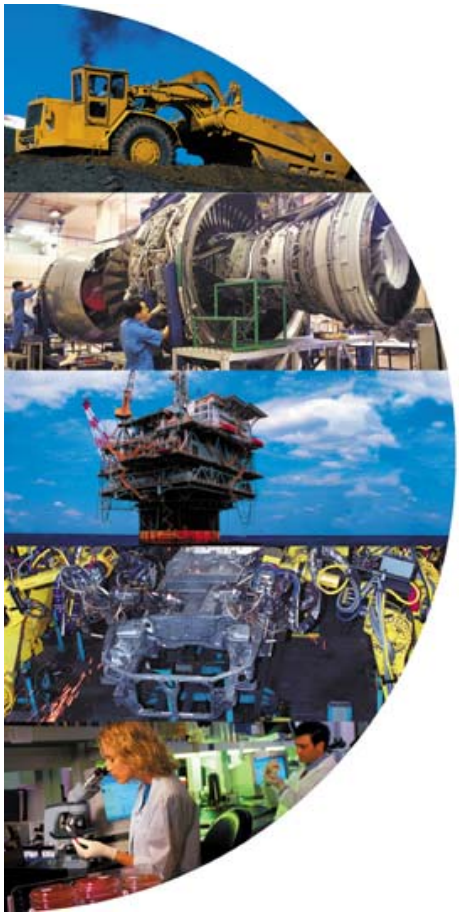


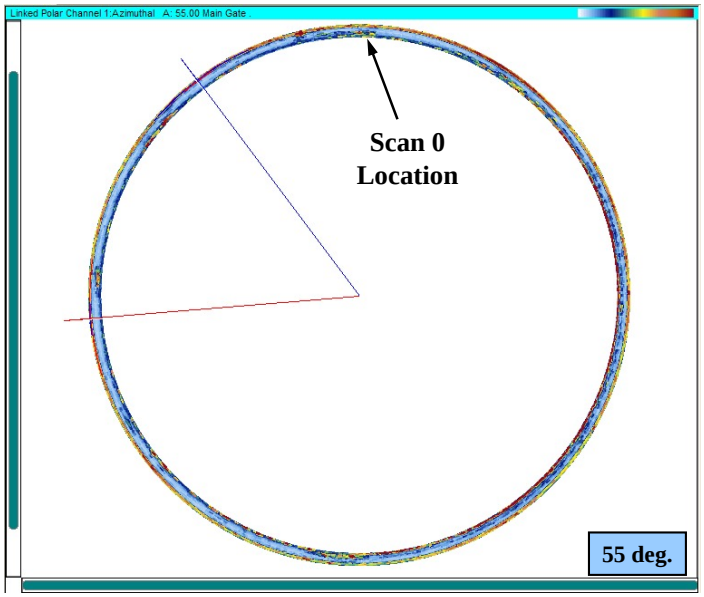
Appendix B1.7.2
Batam Weld #4

THE MATERIALS JOINING EXPERTS

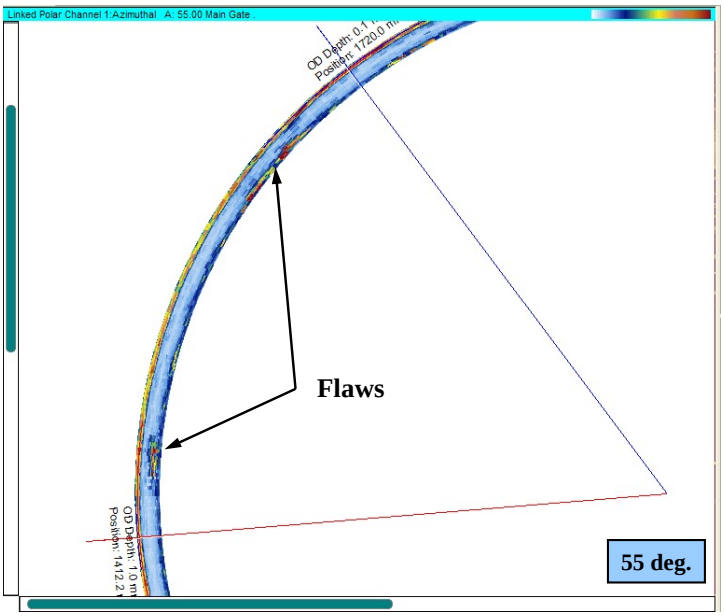
Overview

- Wall thickness 0.54-inch (13.8-mm)
- 24-inch (610-mm)diameter X-65 Pipe
- 12 Real Fabrication Flaws
- Weld was tested by 4 vendors using multi-probe and phased array AUT systems
- Weld was tested at EWI (3rd party) using Focus phased array system with 4 MHz and 7.5 MHz probes and sectorial scans

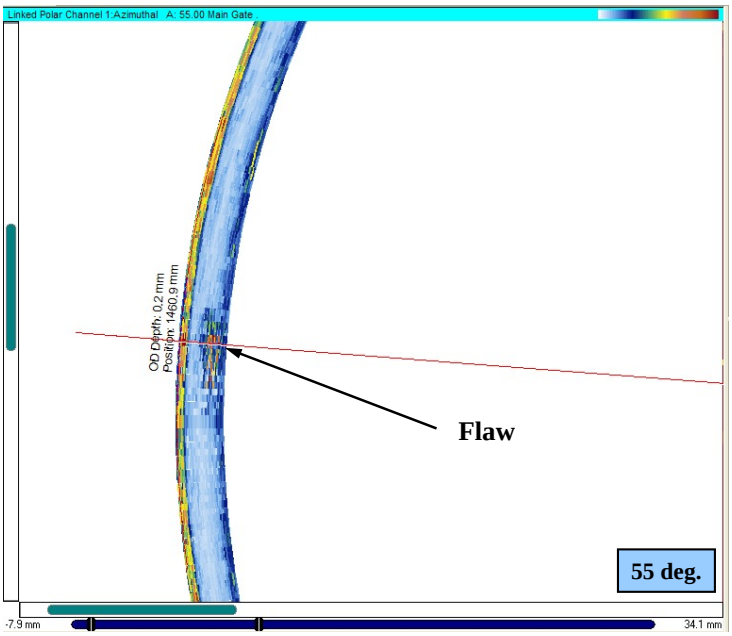
PA 7 MHz DS Scan – Polar View



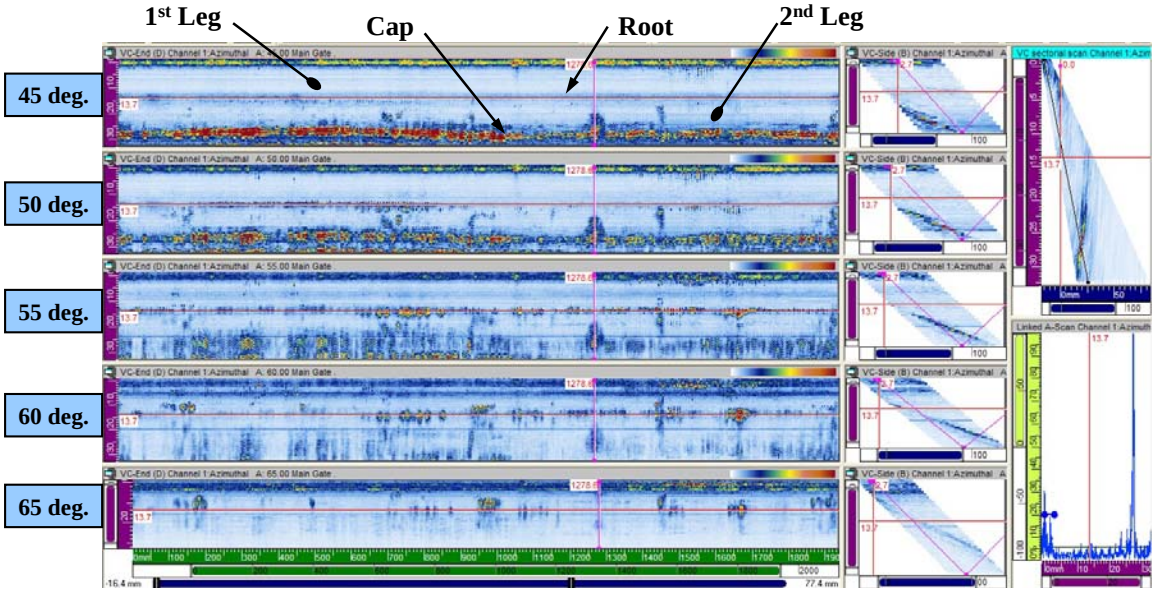
PA 7 MHz DS Scan – Polar View Location 1412 to 1720



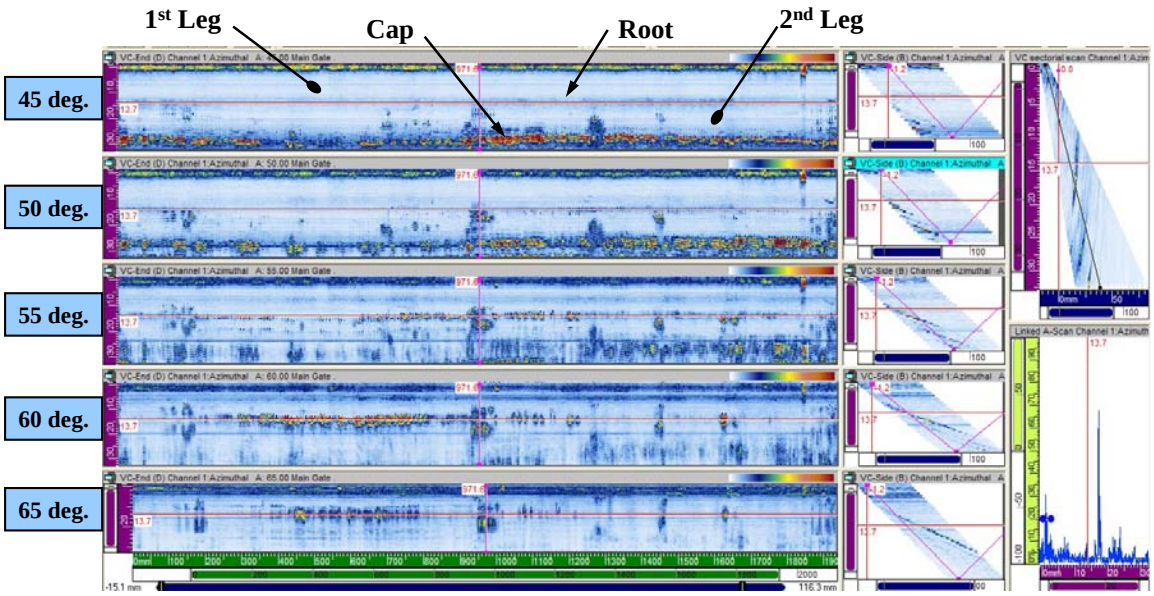
PA 7 MHz DS Scan – Polar View Location 1412 to 1720



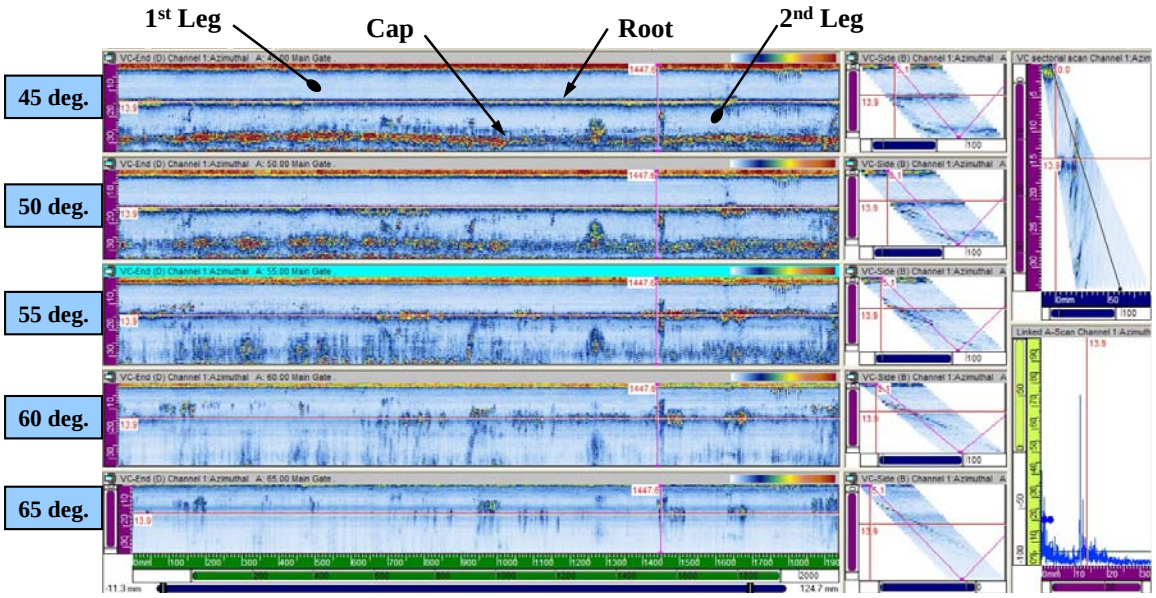
PA 4 MHz US Scan



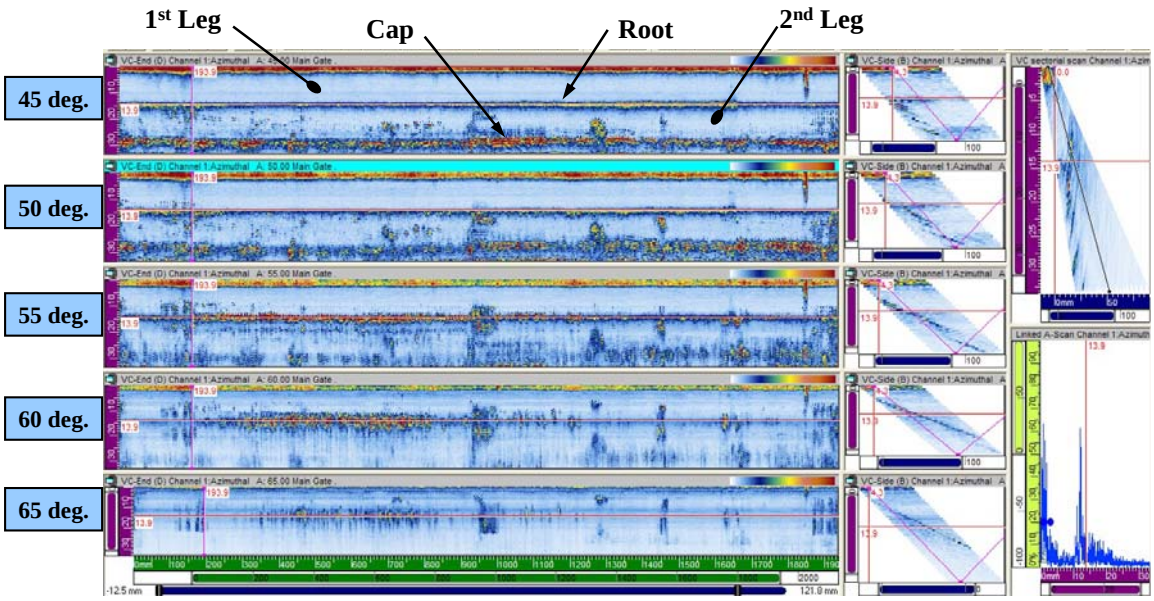
PA 4 MHz DS Scan



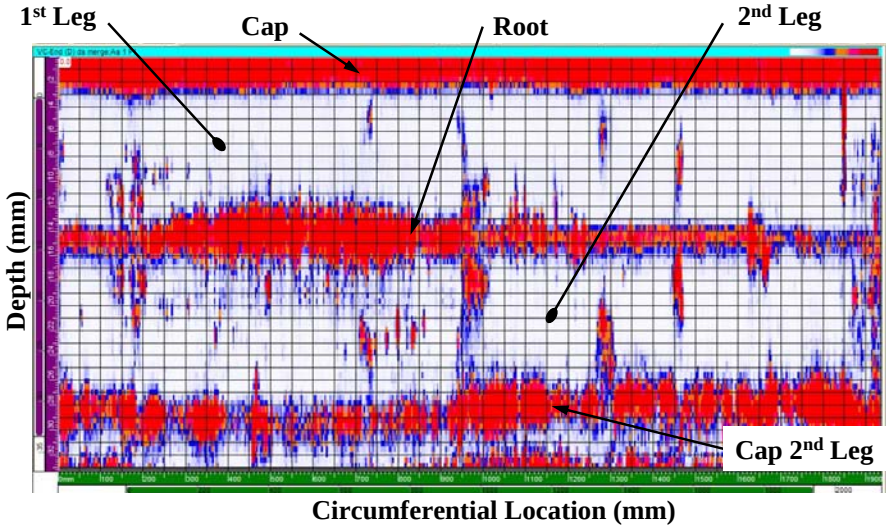
PA 7 MHz US Scan



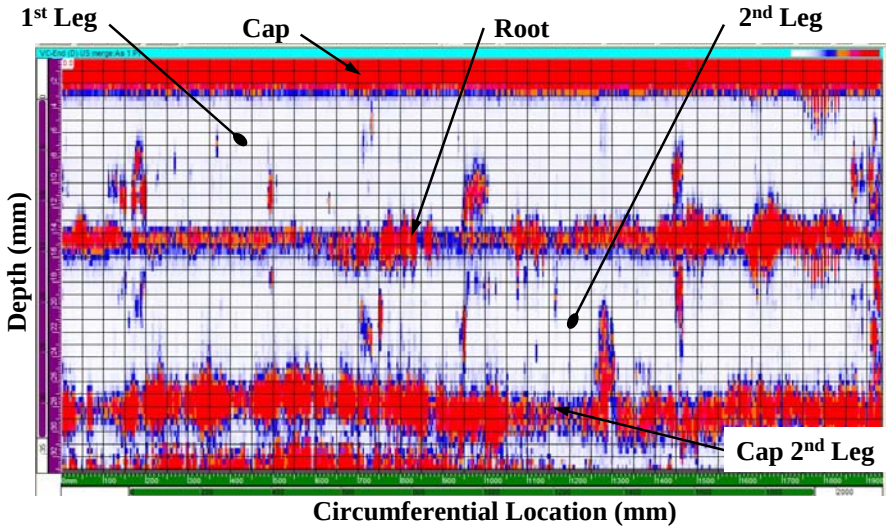
PA 7 MHz DS Scan



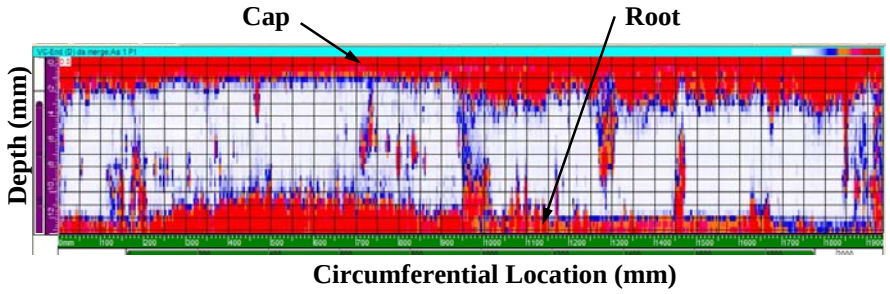
PA 7 MHz DS 45 to 70 Deg. Scan Data Merged; (Amp. >= 40%)



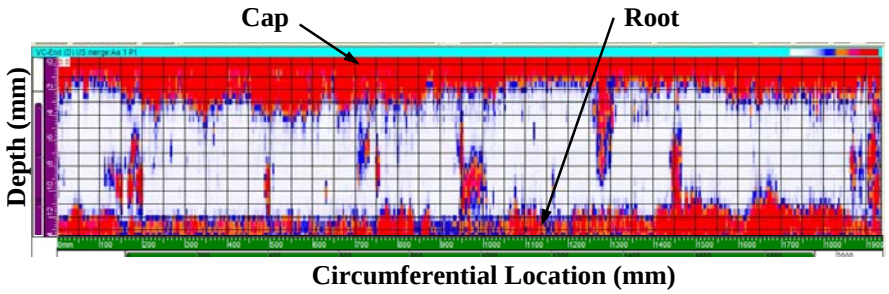
PA 7 MHz US 45 to 70 Deg. Scan Data Merged; (Amp. >= 40%)



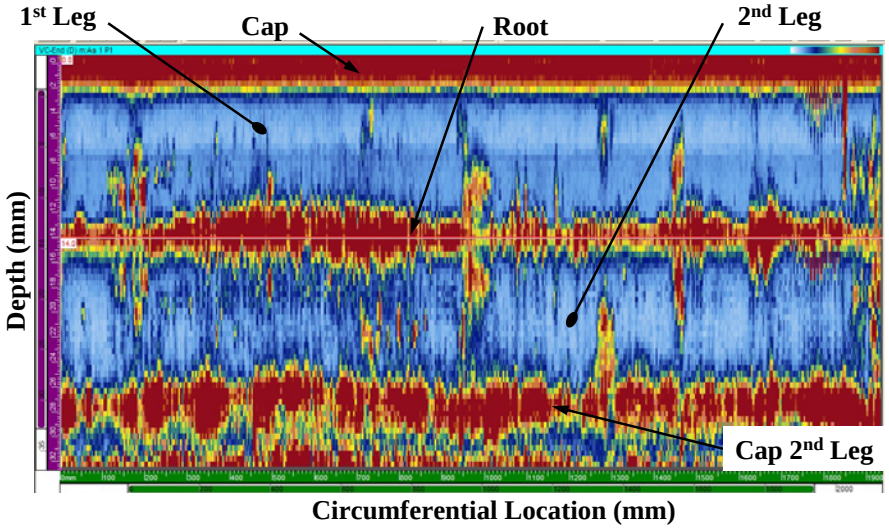
PA 7 MHz DS 45 to 70 Deg. Scan Data Merged with 2nd Leg Folded Up On 1st Leg; (Amp. >= 40%)



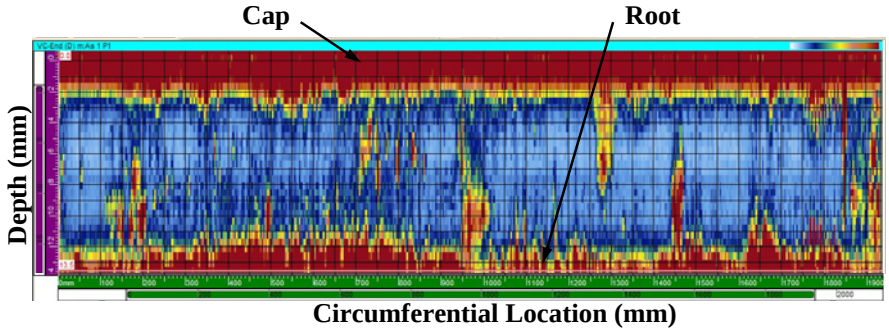
PA 7 MHz US 45 to 70 Deg. Scan Data Merged with 2nd Leg Folded Up On 1st Leg; (Amp. >= 40%)



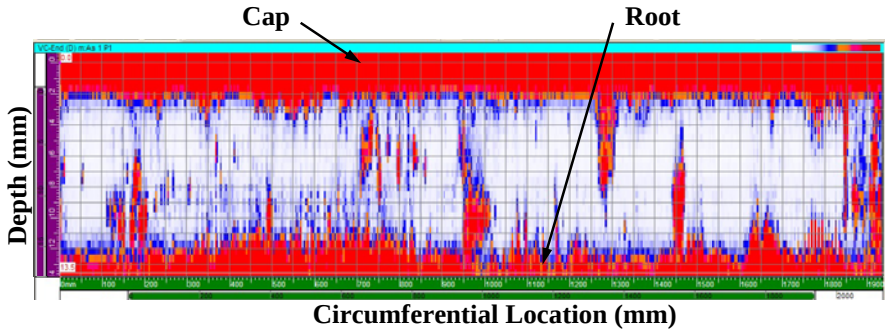
PA 7 MHz US & DS 45 to 70 Deg. Scan Data Combined & Merged



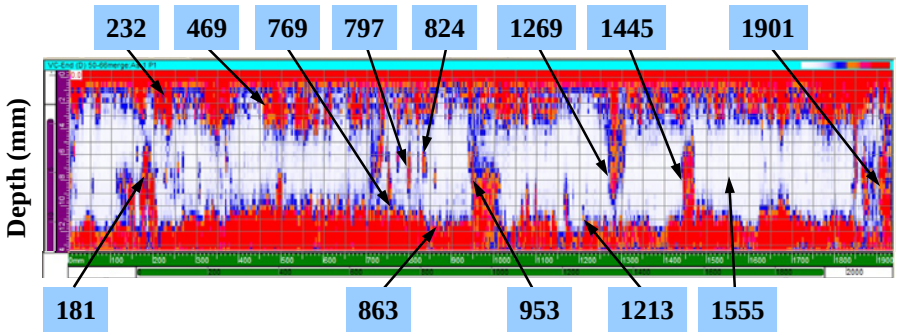
PA 7 MHz US & DS 45 to 70 Deg. Scan Data Combined & Merged with 2nd Leg Folded Up On 1st Leg



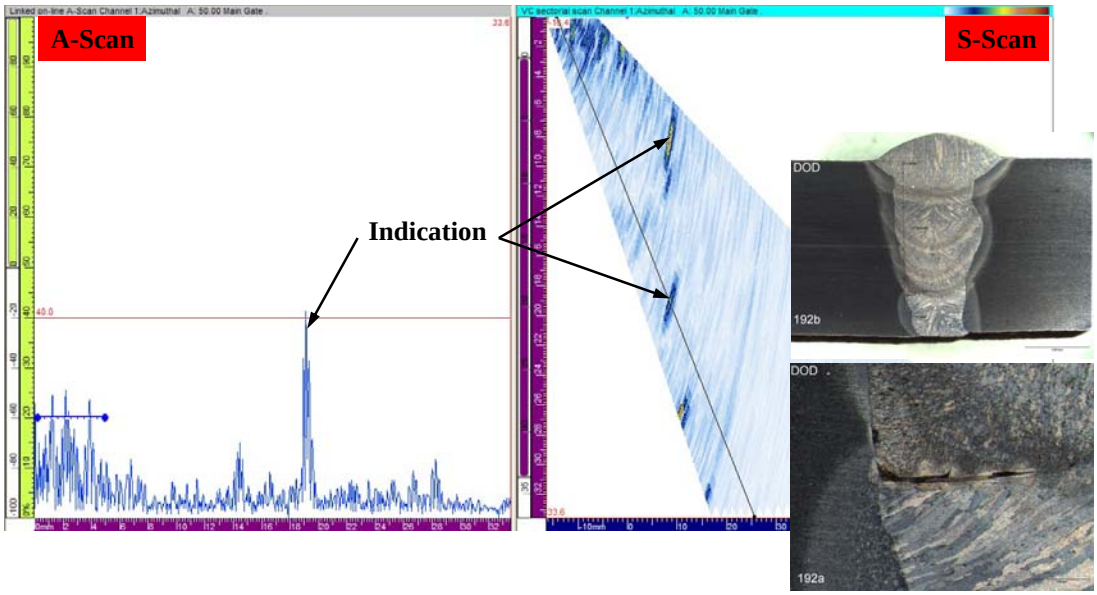
PA 7 MHz US & DS 45 to 70 Deg. Scan Data Combined & Merged with 2nd Leg Folded Up On 1st Leg; (Amp. >= 40%)



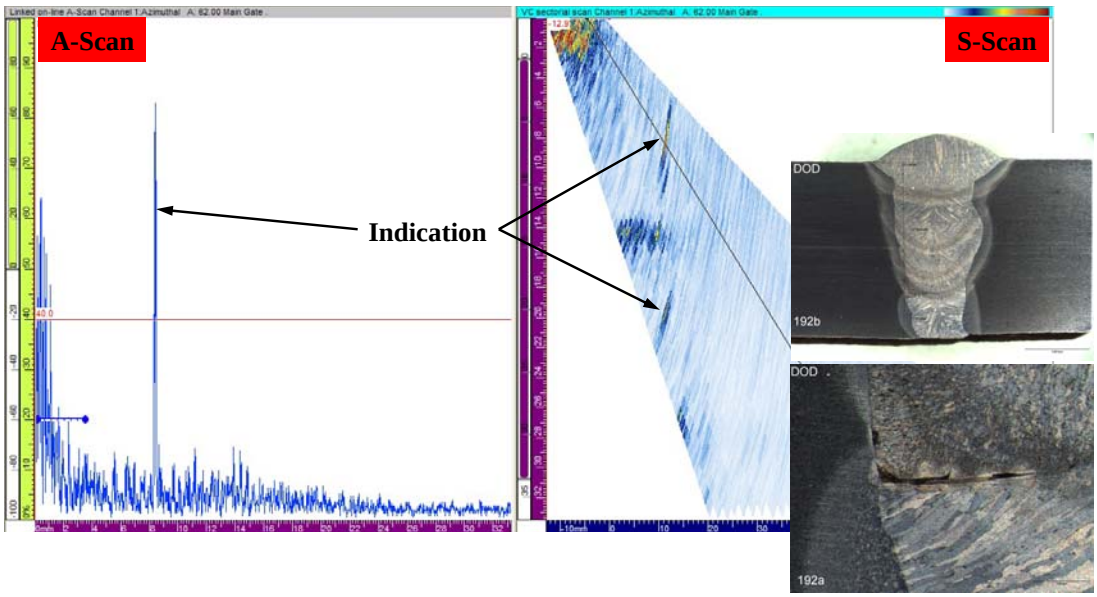
Flaw Locations Identified For Metallographic Cross-Sectioning



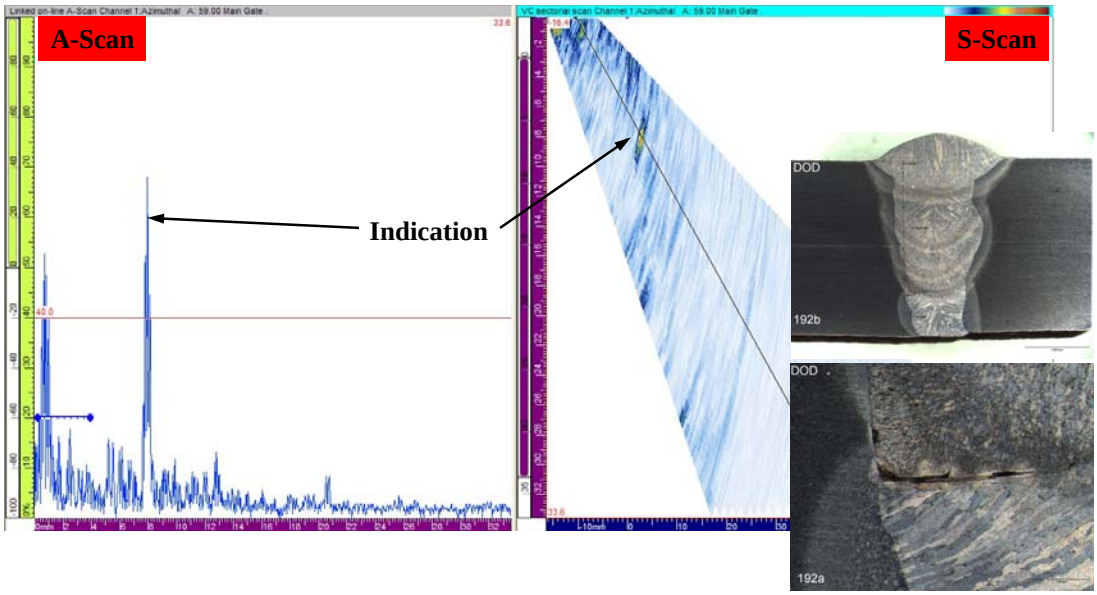
Location 181 US – PA4 64/21, FD 20



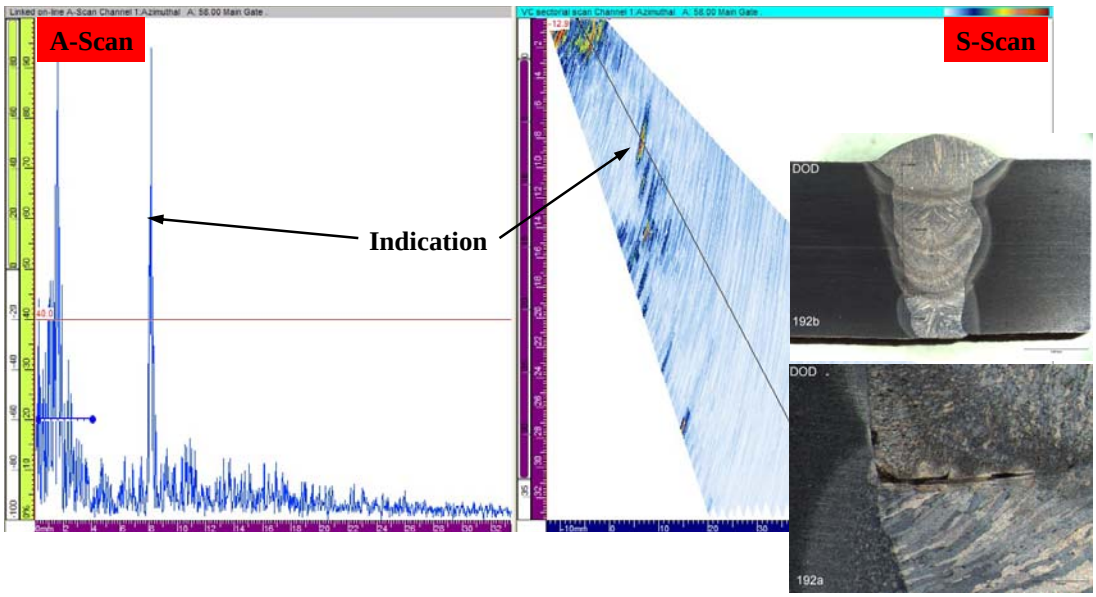
Location 181 US – PA7 60/16, FD 20



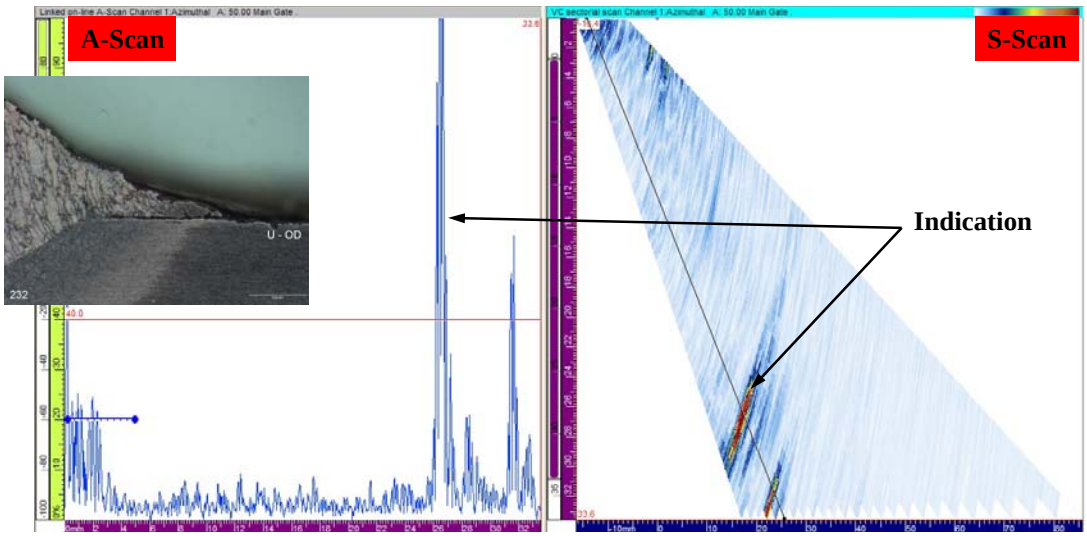
Location 181 DS – PA4 64/21, FD 20



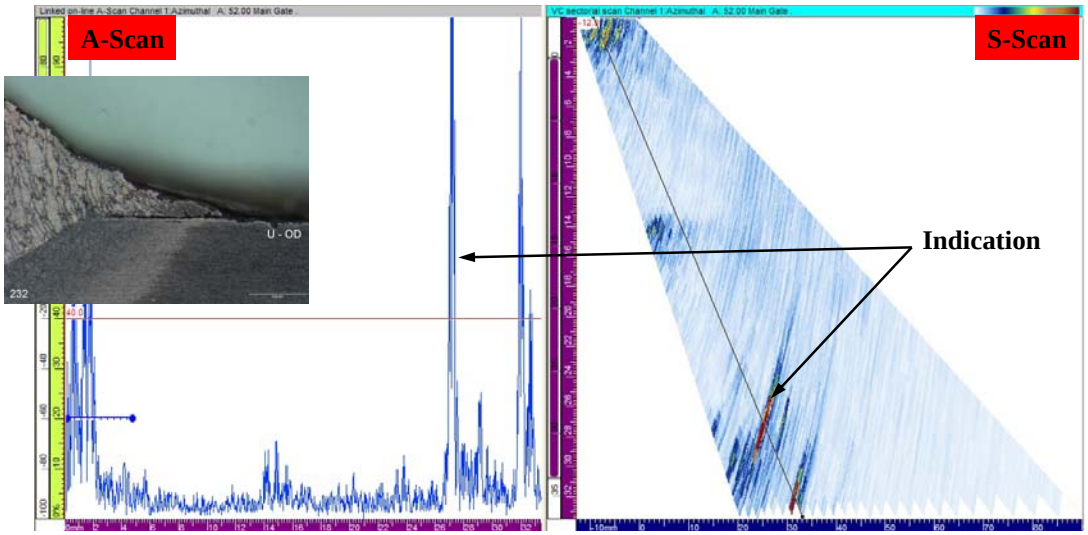
Location 181 DS – PA7 60/16, FD 20



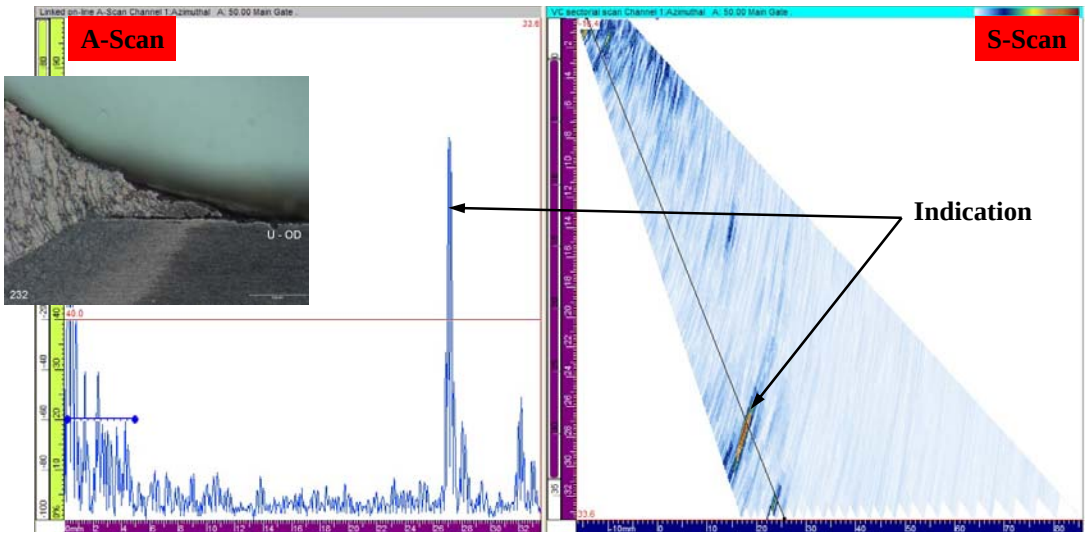
Location 232 US – PA4 64/21, FD 20



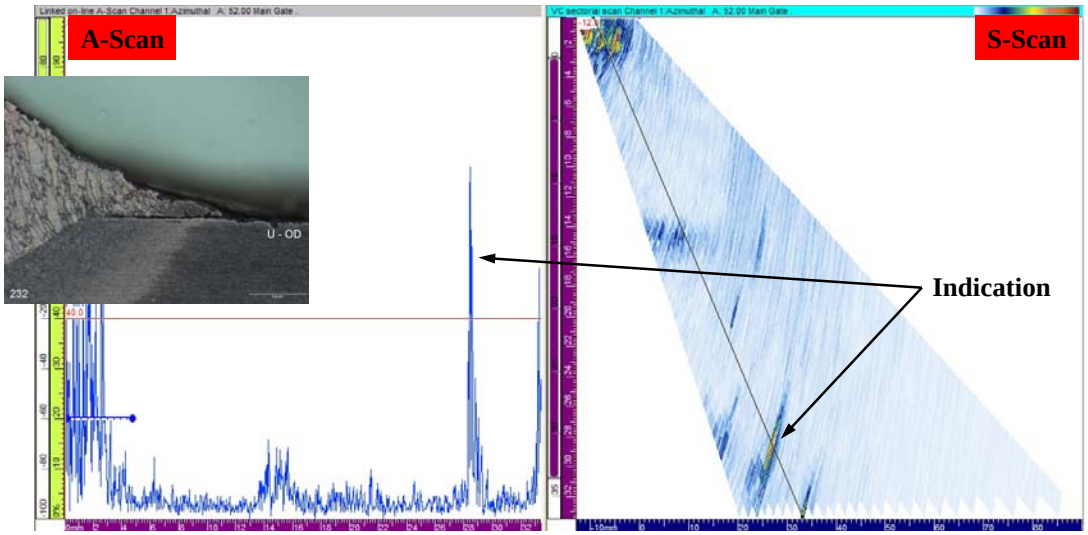
Location 232 US – PA7 60/16, FD 20



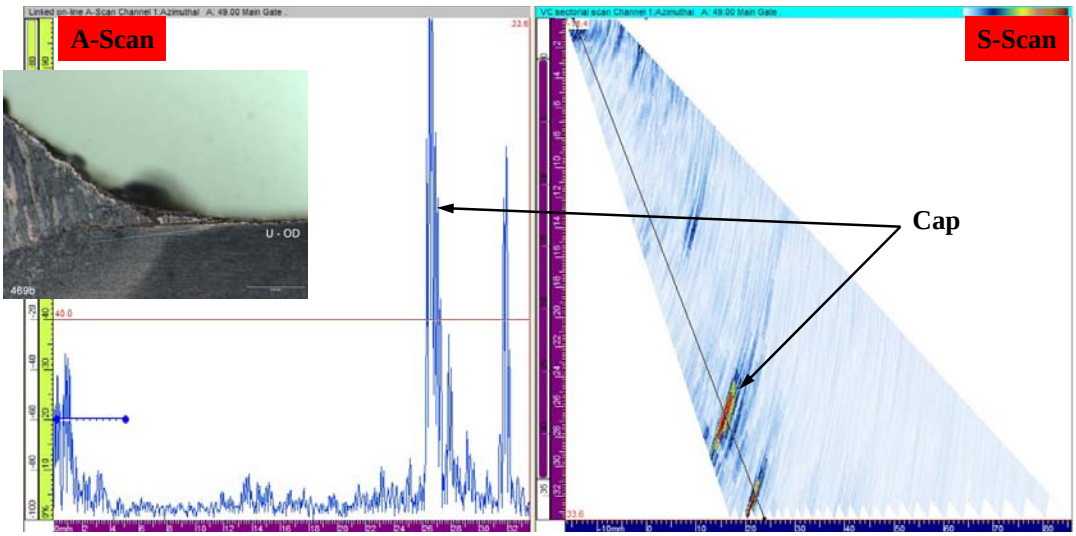
Location 232 DS – PA4 64/21, FD 20



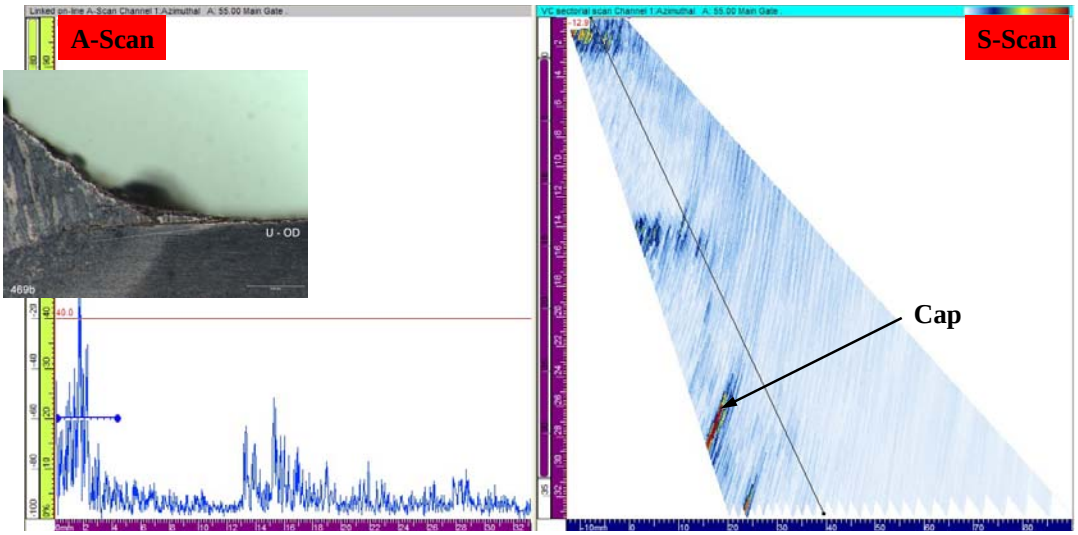
Location 232 DS – PA7 60/16, FD 20



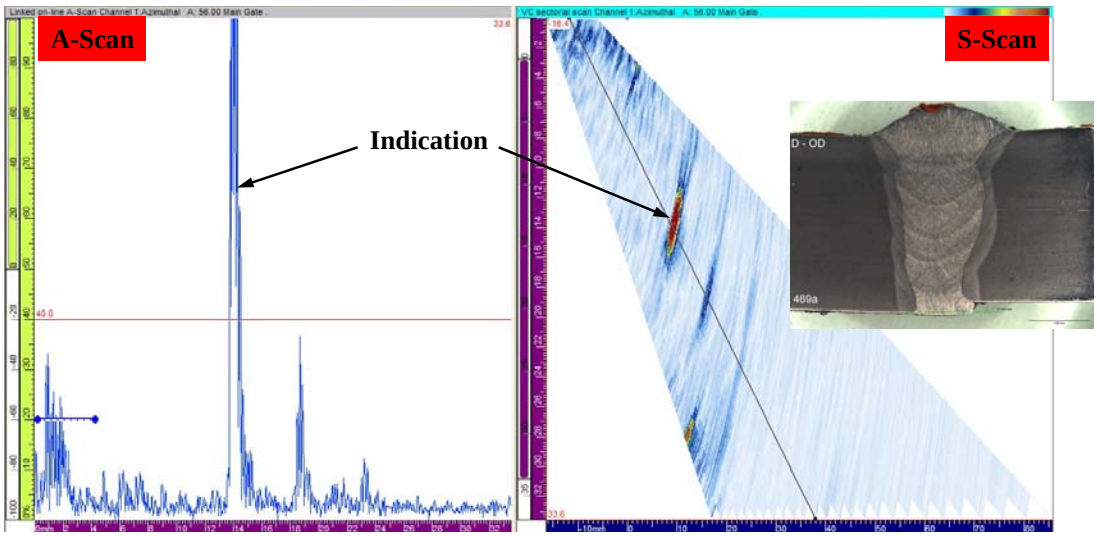
Location 469 US – PA4 64/21, FD 20



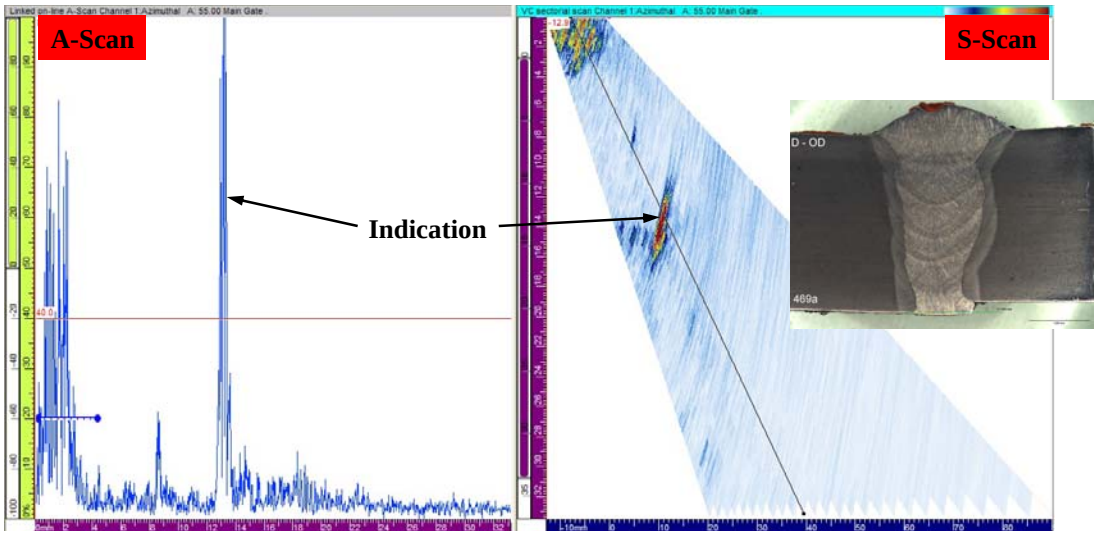
Location 469 US – PA7 60/16, FD 20



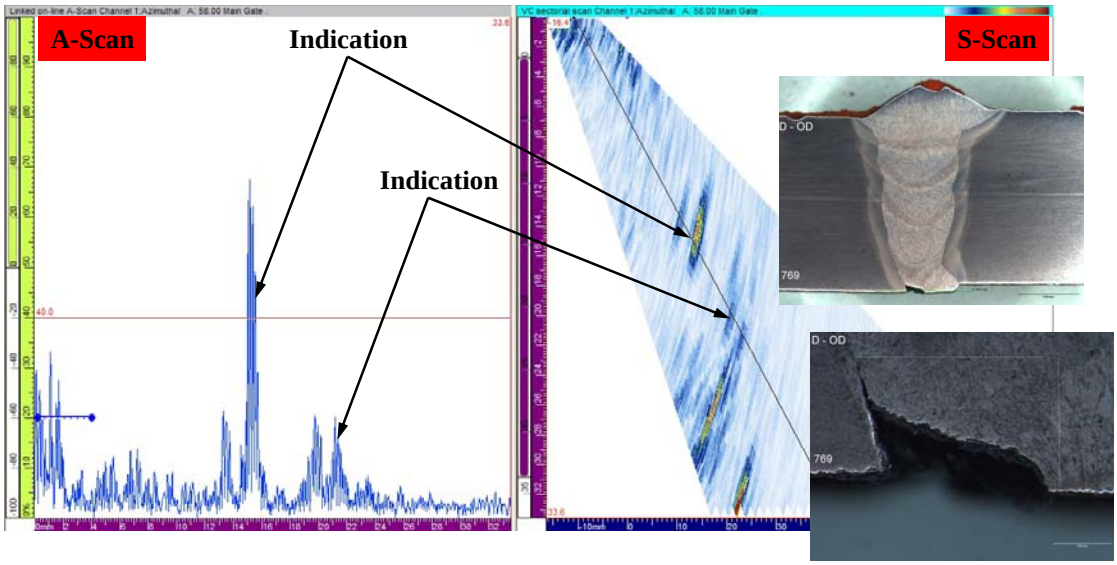
Location 469 DS – PA4 64/21, FD 20



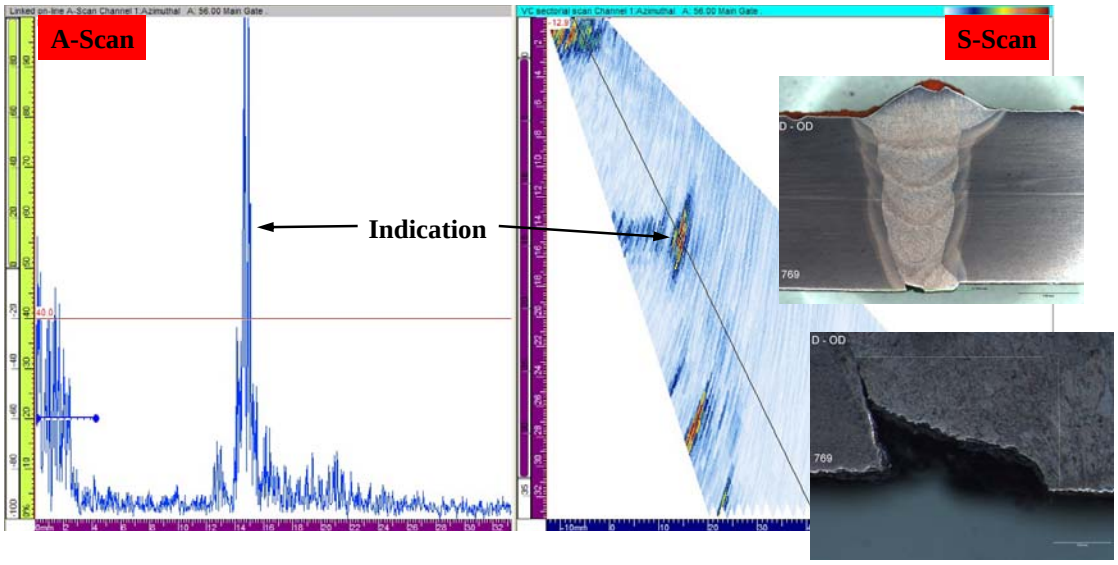
Location 469 DS – PA7 60/16, FD 20



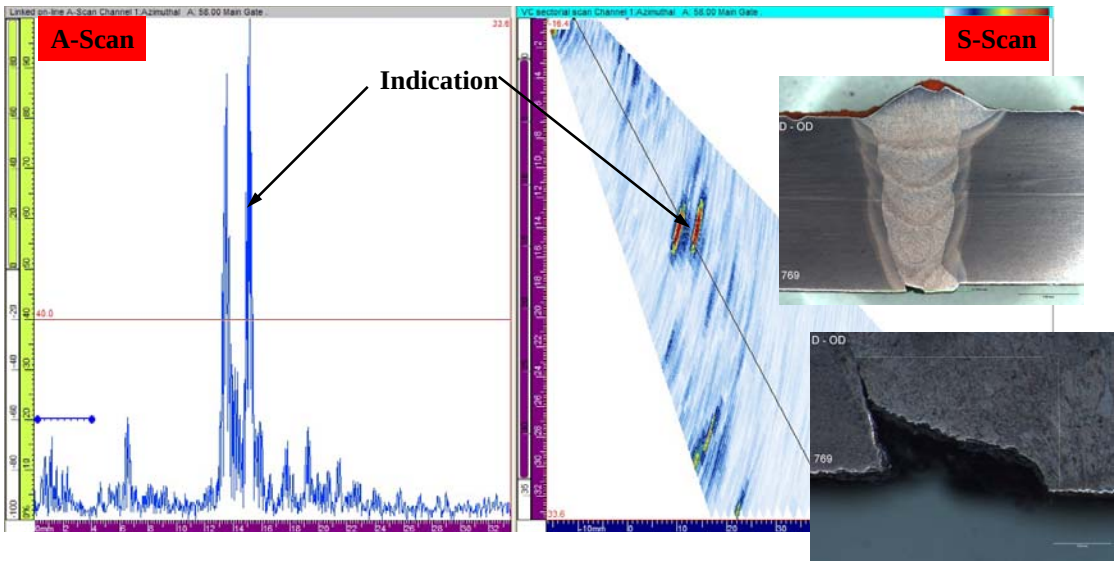
Location 769 US – PA4 64/21, FD 20



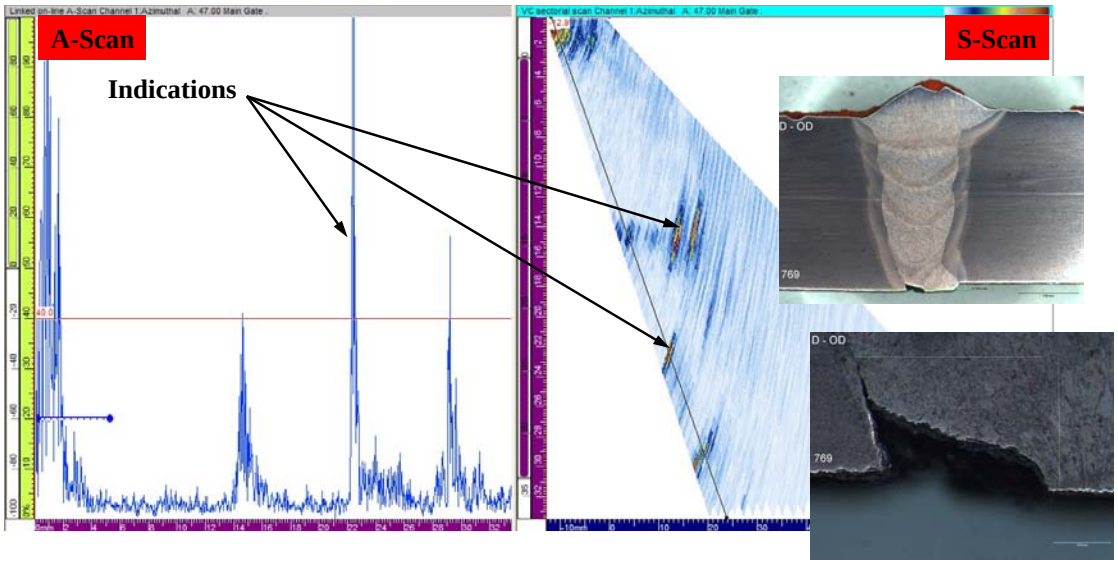
Location 769 US – PA7 60/16, FD 20



Location 769 DS – PA4 64/21, FD 20

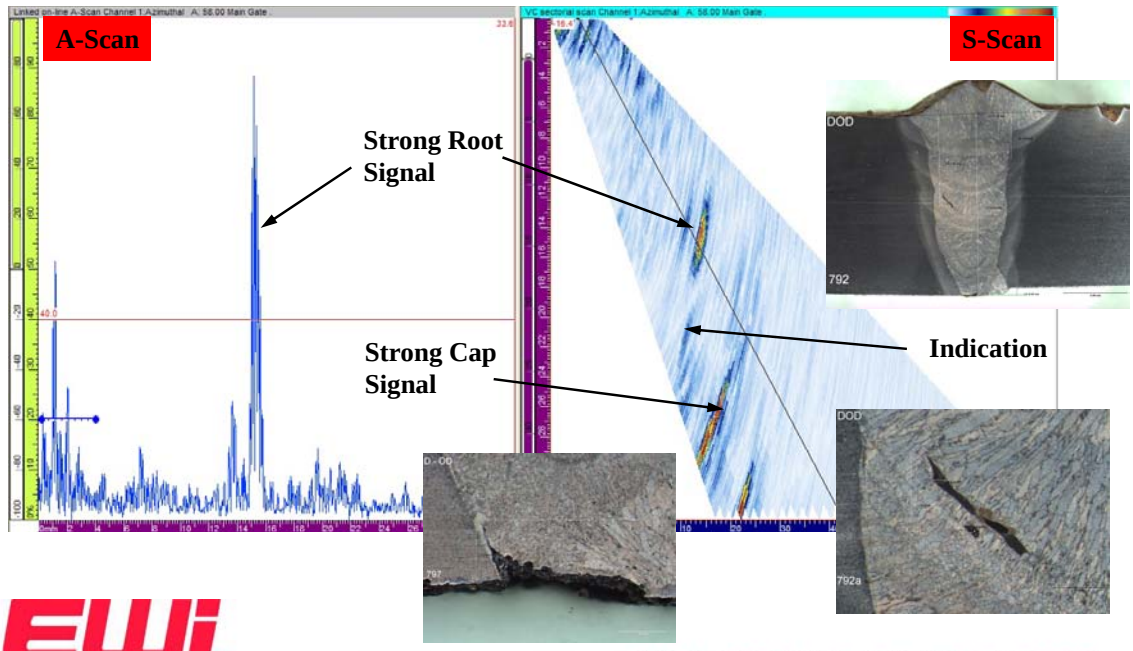


Location 769 DS – PA7 60/16, FD 20



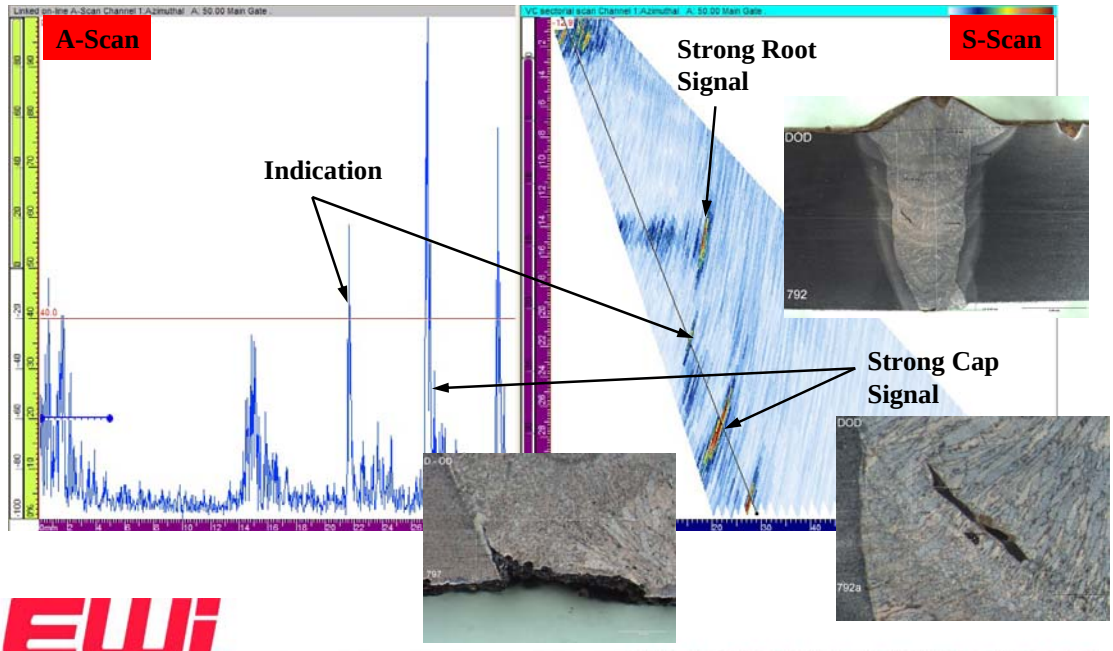
THE MATERIALS JOINING EXPERTS

Location 797 US – PA4 64/21, FD 20



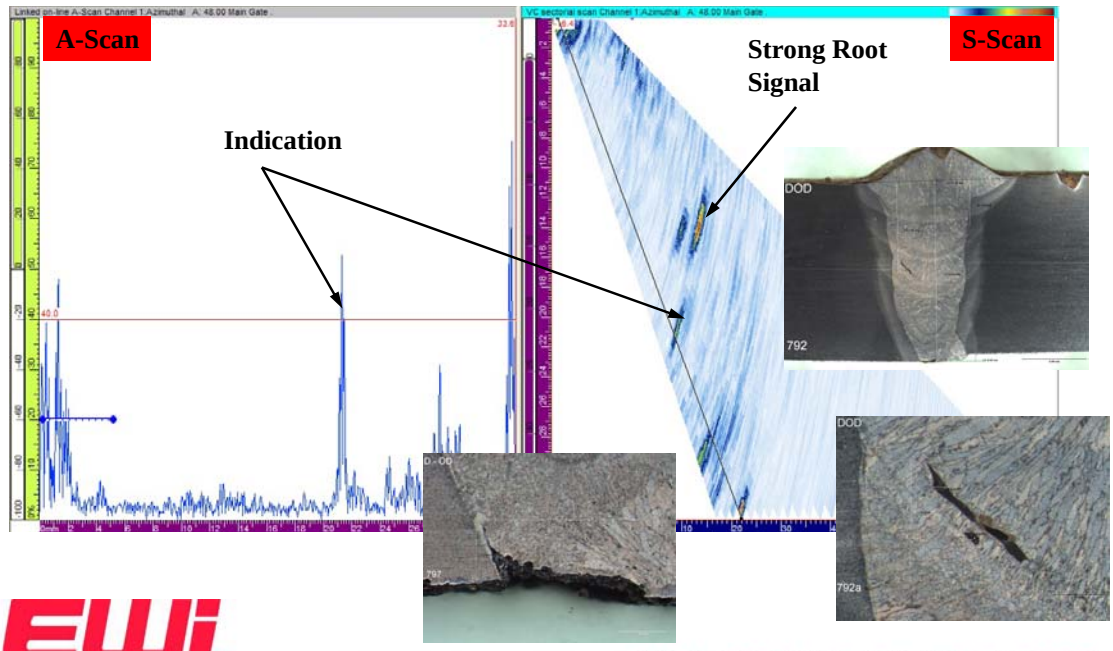
THE MATERIALS JOINING EXPERTS

Location 797 US – PA7 60/16, FD 20



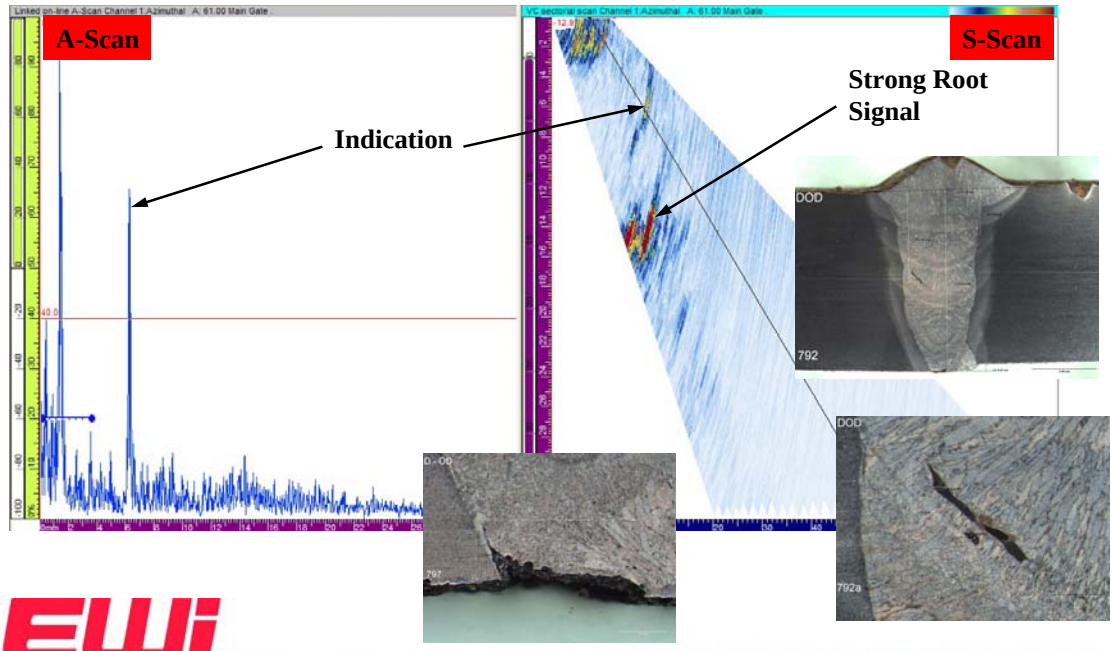
THE MATERIALS JOINING EXPERTS

Location 797 DS – PA4 64/21, FD 20

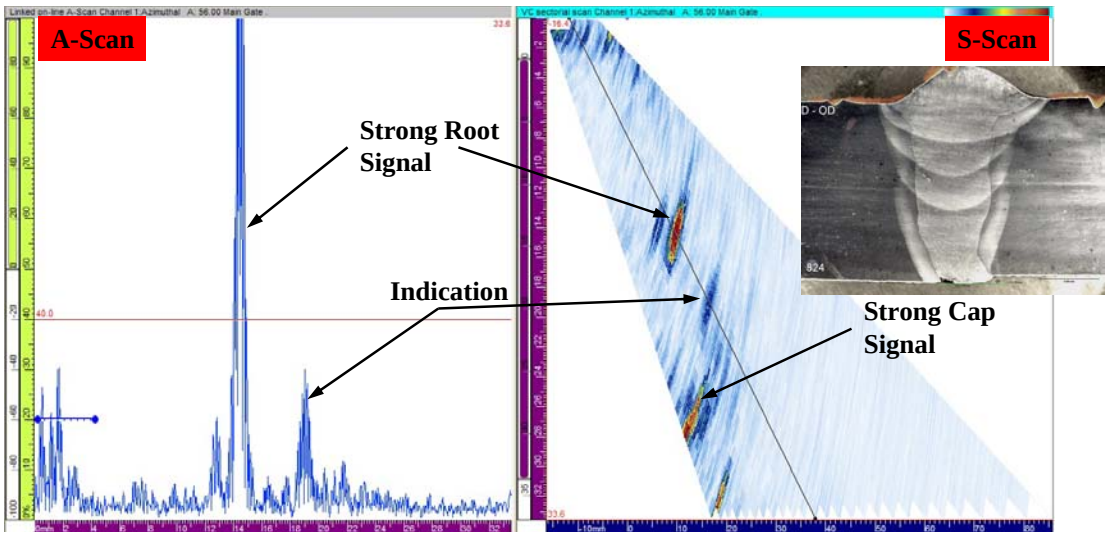


THE MATERIALS JOINING EXPERTS

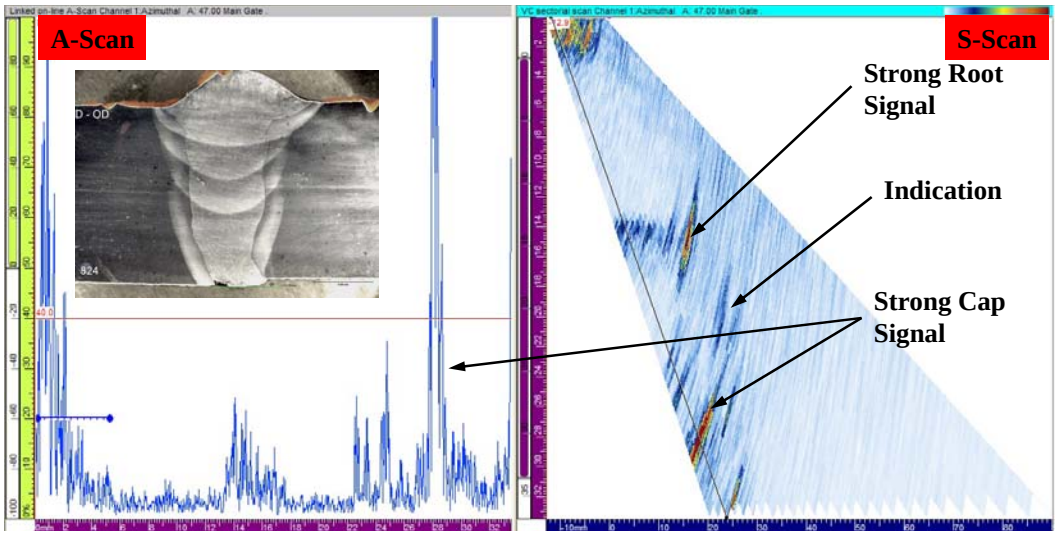
Location 797 DS – PA7 60/16, FD 20



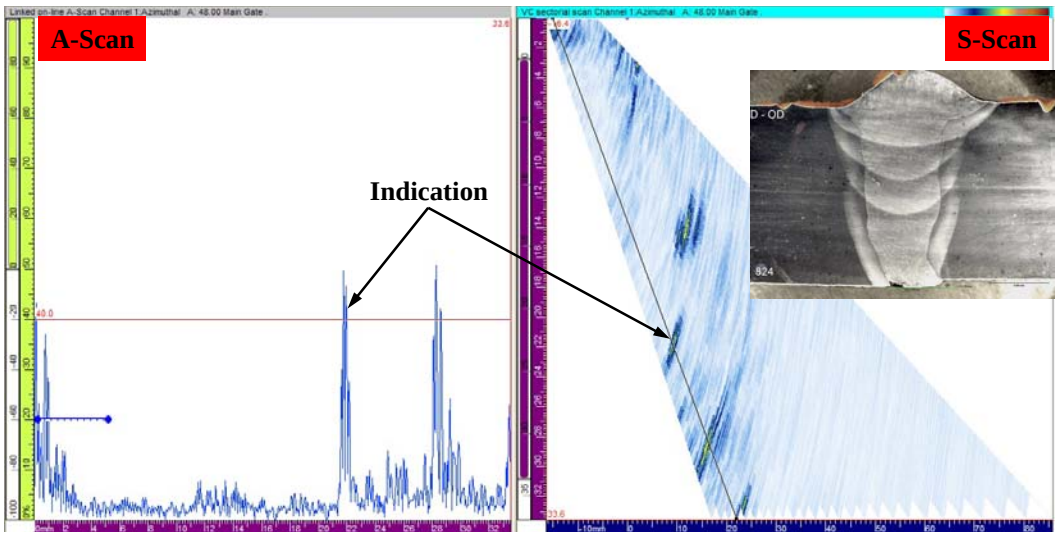
Location 824 US – PA4 64/21, FD 20



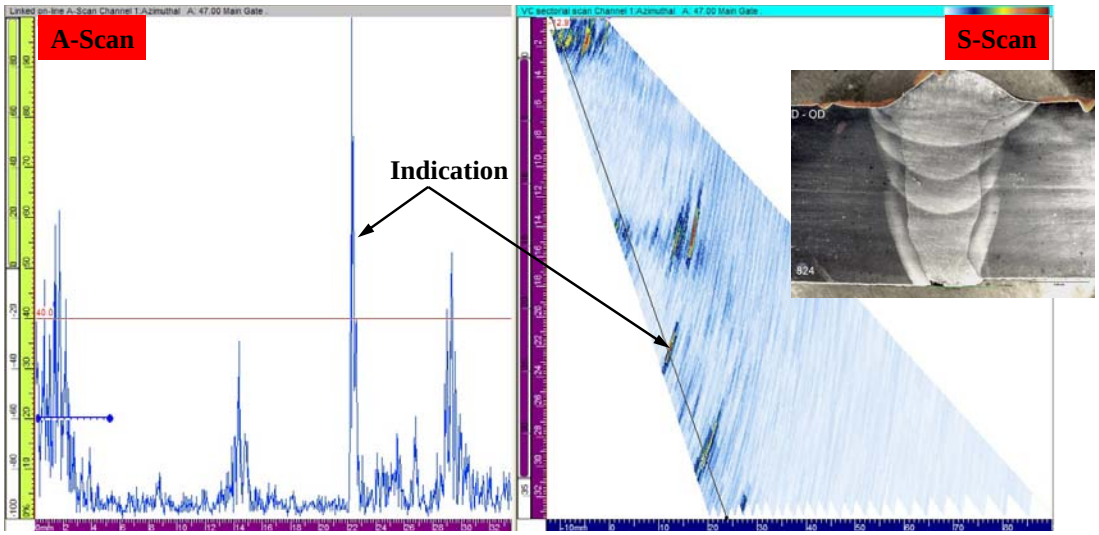
Location 824 US – PA7 60/16, FD 20



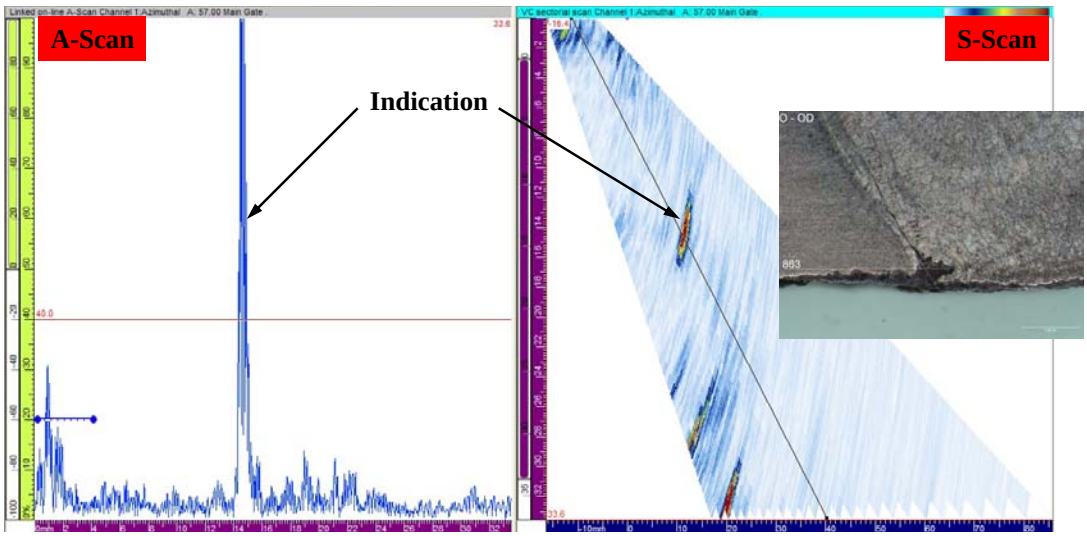
Location 824 DS – PA4 64/21, FD 20



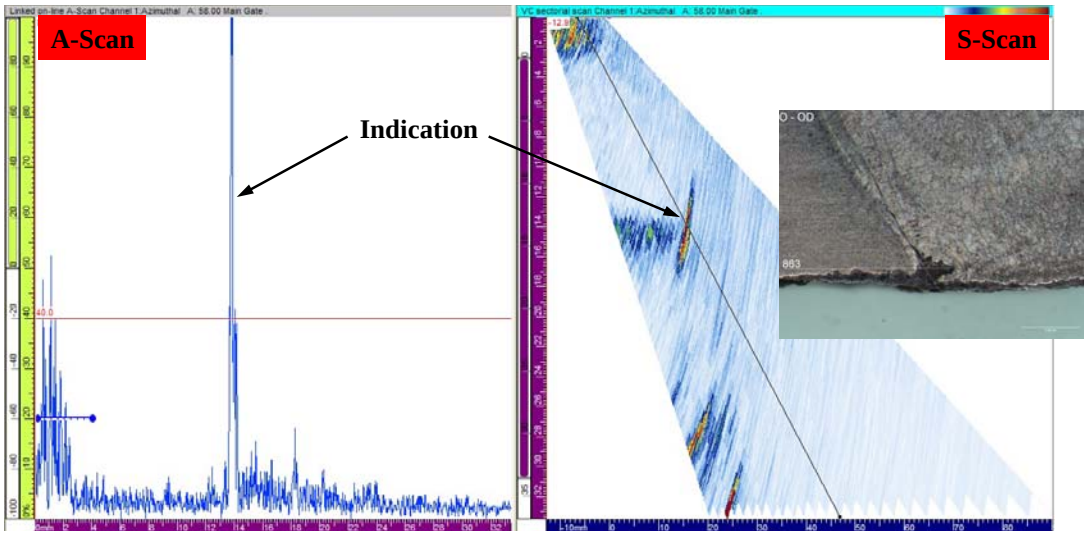
Location 824 DS – PA7 60/16, FD 20



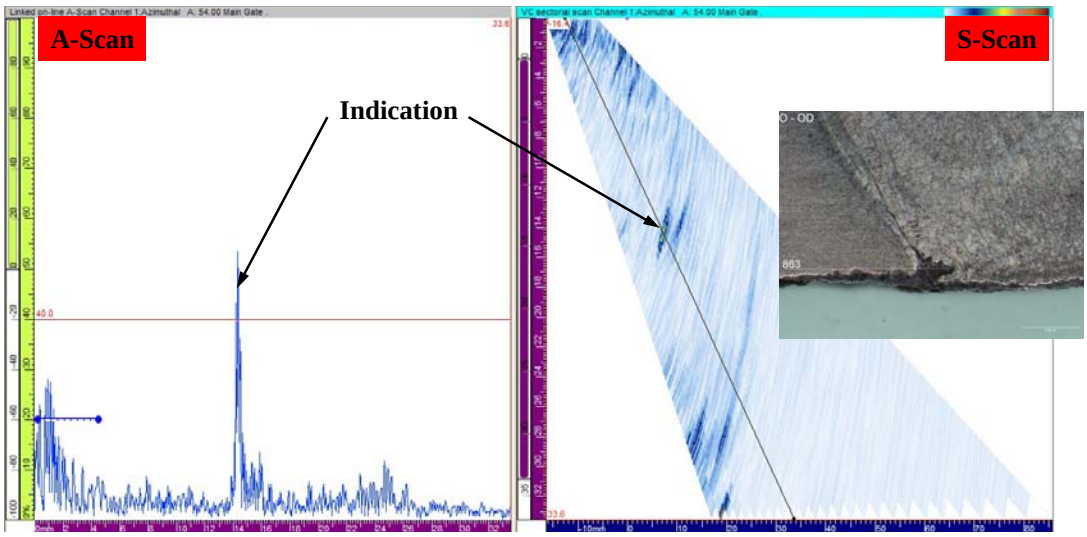
Location 863 US – PA4 64/21, FD 20



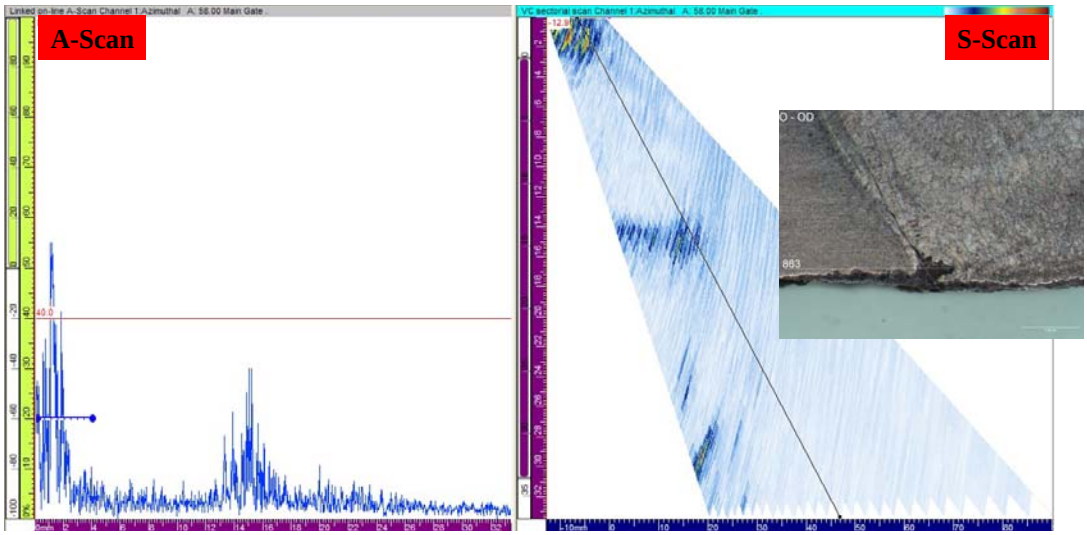
Location 863 US – PA7 60/16, FD 20



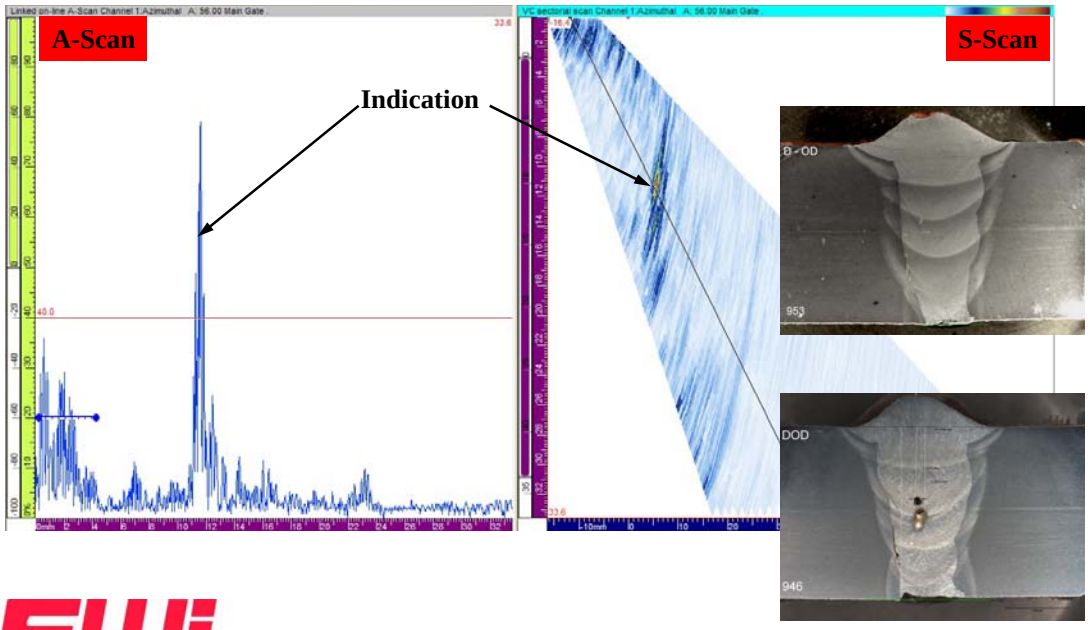
Location 863 DS – PA4 64/21, FD 20



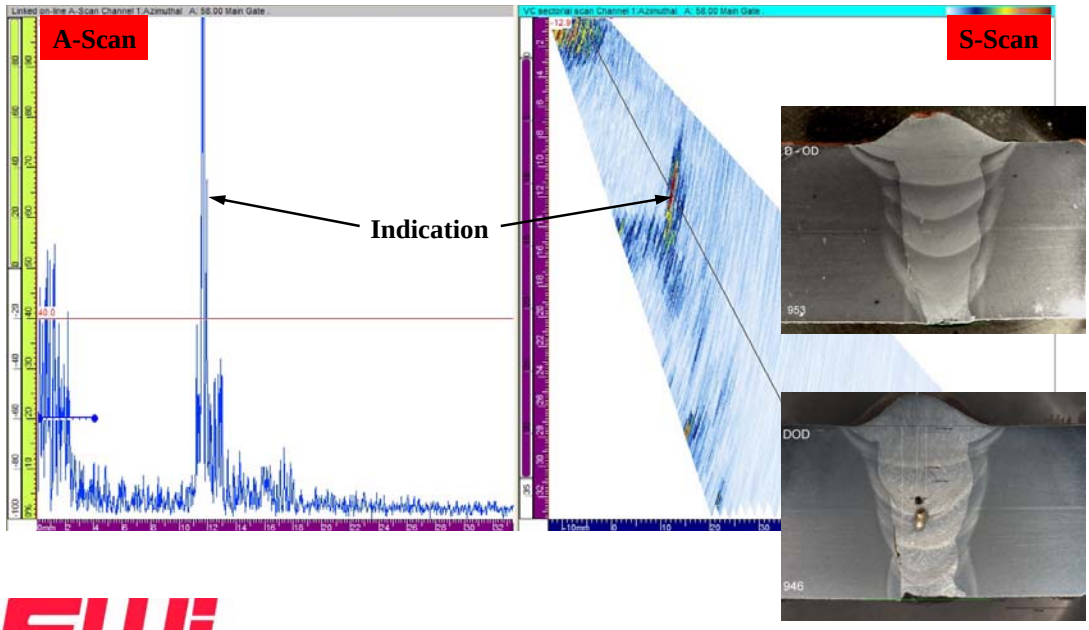
Location 863 DS – PA7 60/16, FD 20



Location 953 US – PA4 64/21, FD 20

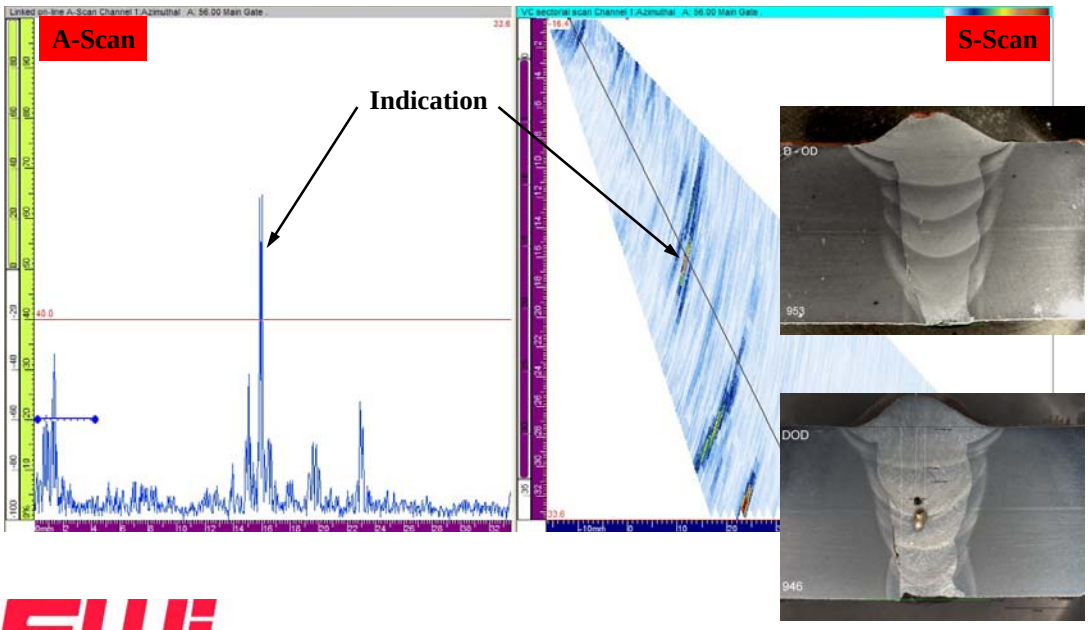


Location 953 US – PA7 60/16, FD 20



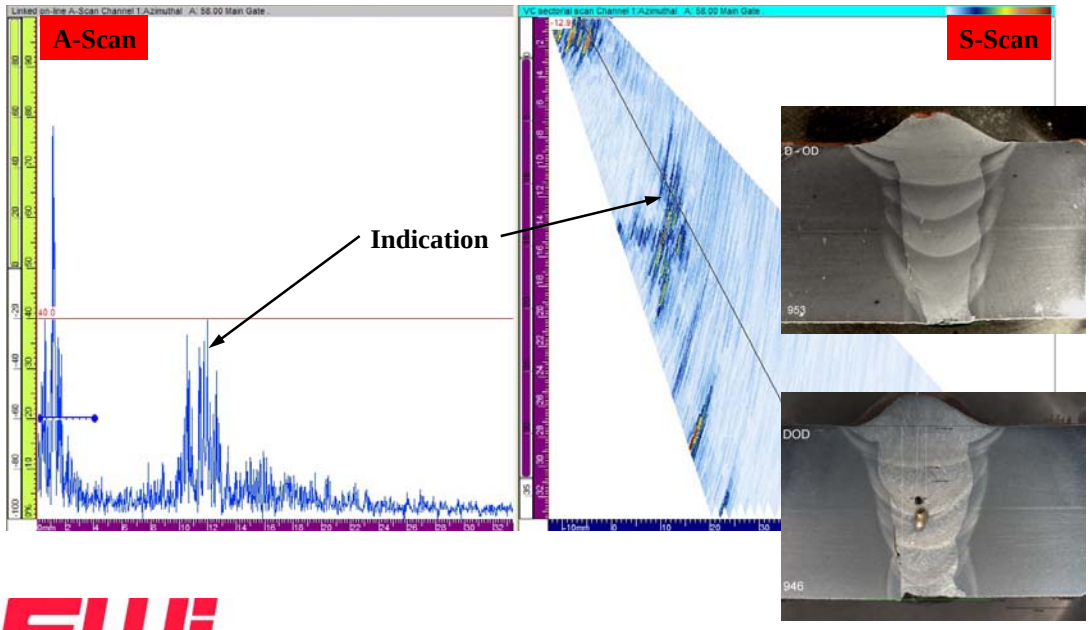
THE MATERIALS JOINING EXPERTS

Location 953 DS – PA4 64/21, FD 20

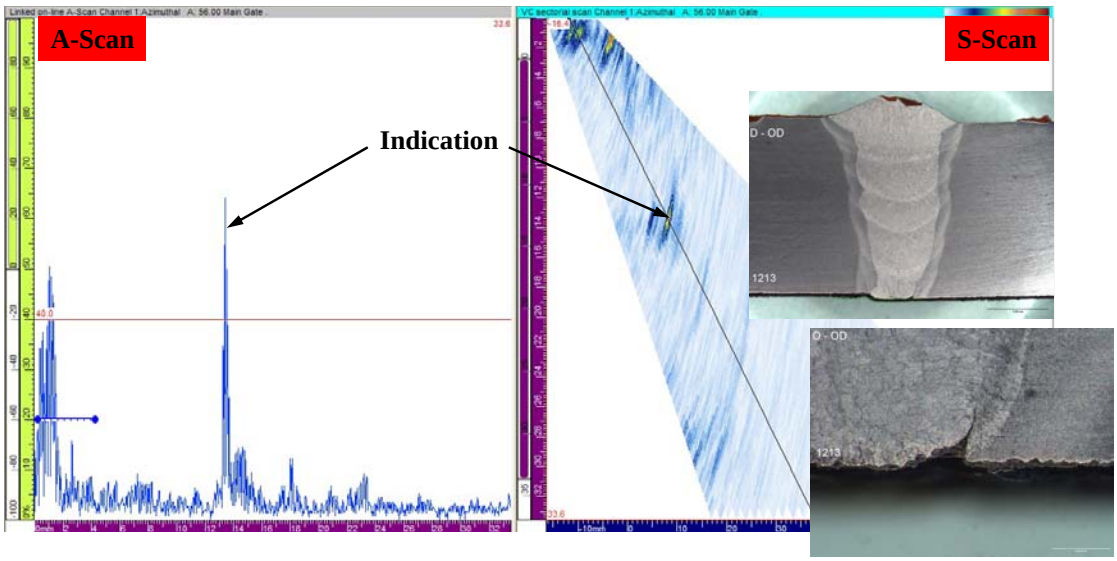


THE MATERIALS JOINING EXPERTS

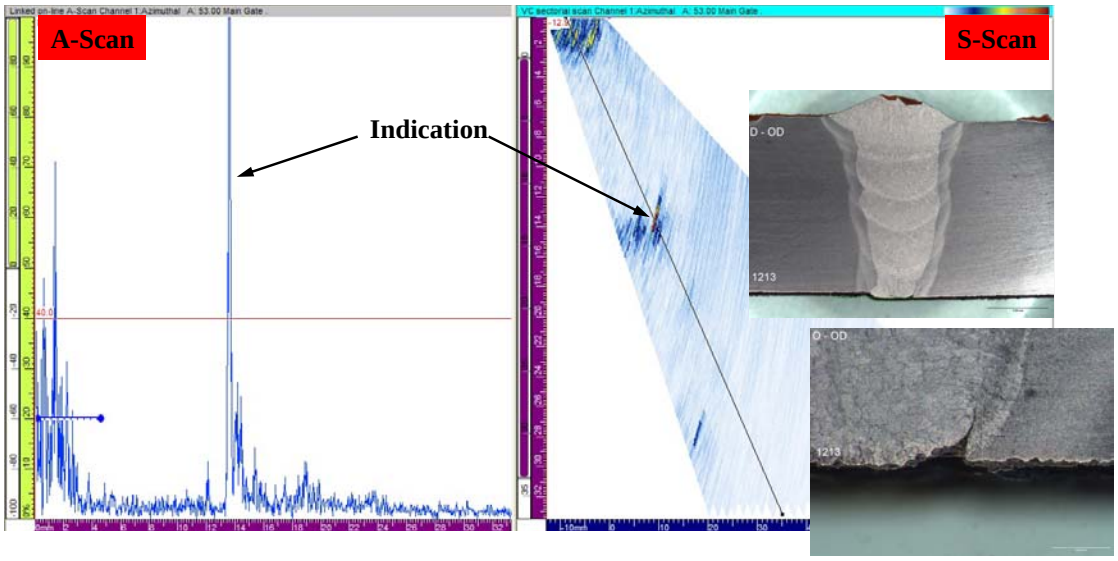
Location 953 DS – PA7 60/16, FD 20



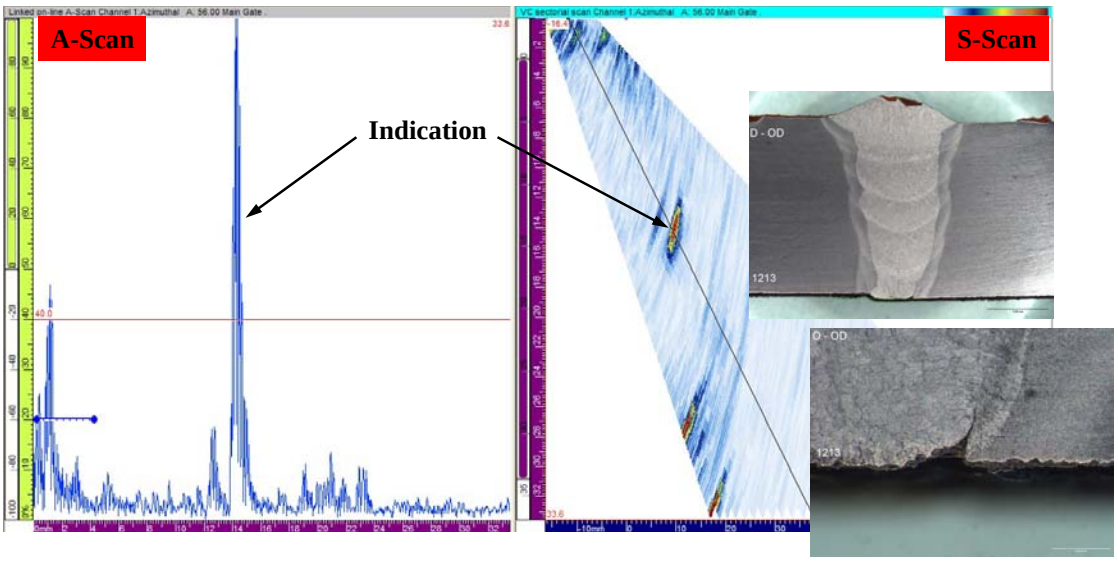
Location 1213 US – PA4 64/21, FD 20



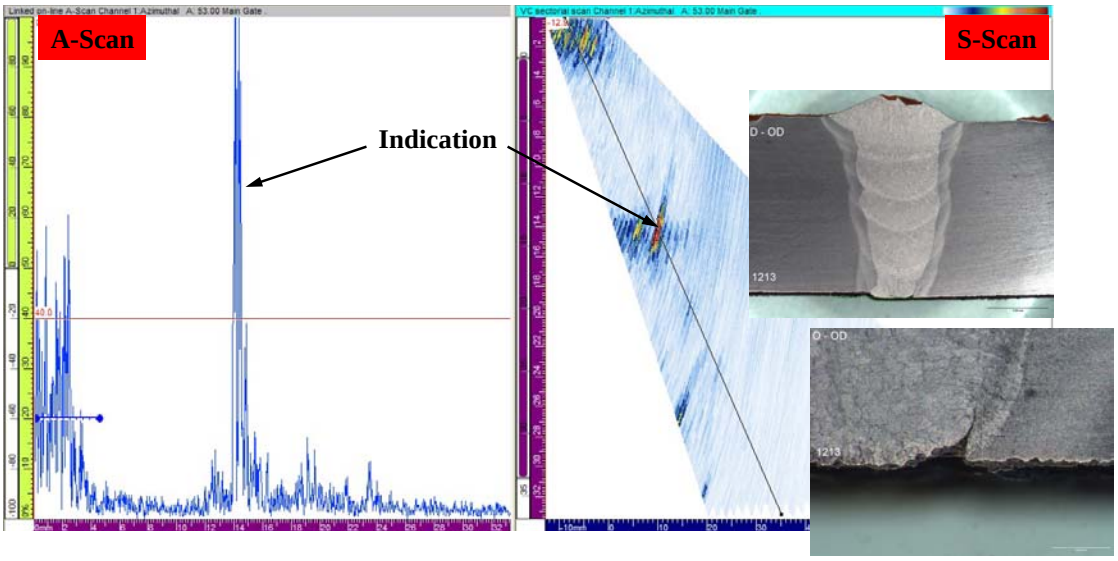
Location 1213 US – PA7 60/16, FD 20



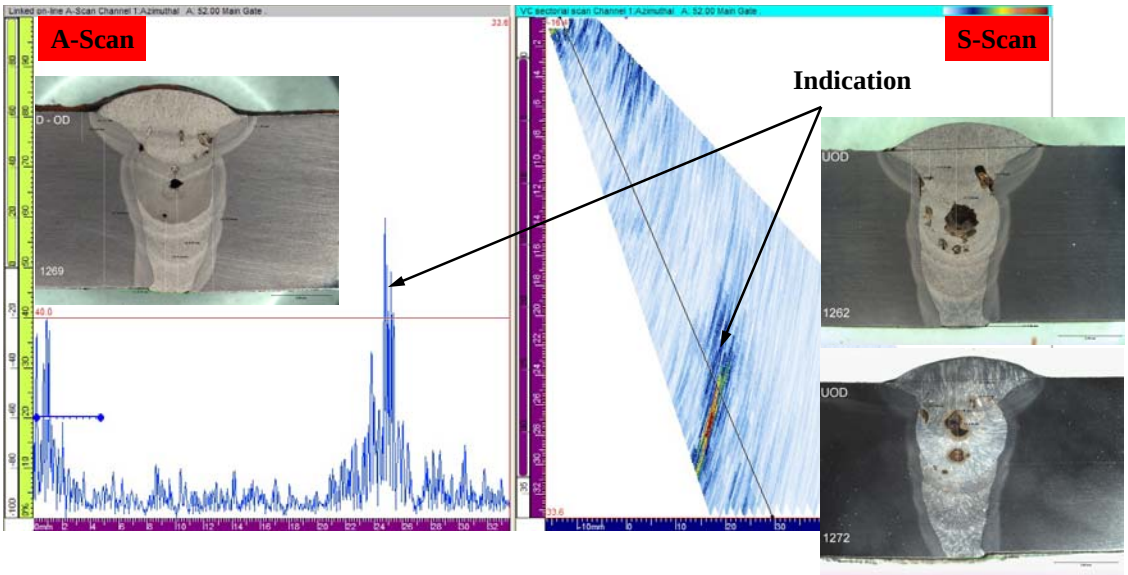
Location 1213 DS – PA4 64/21, FD 20



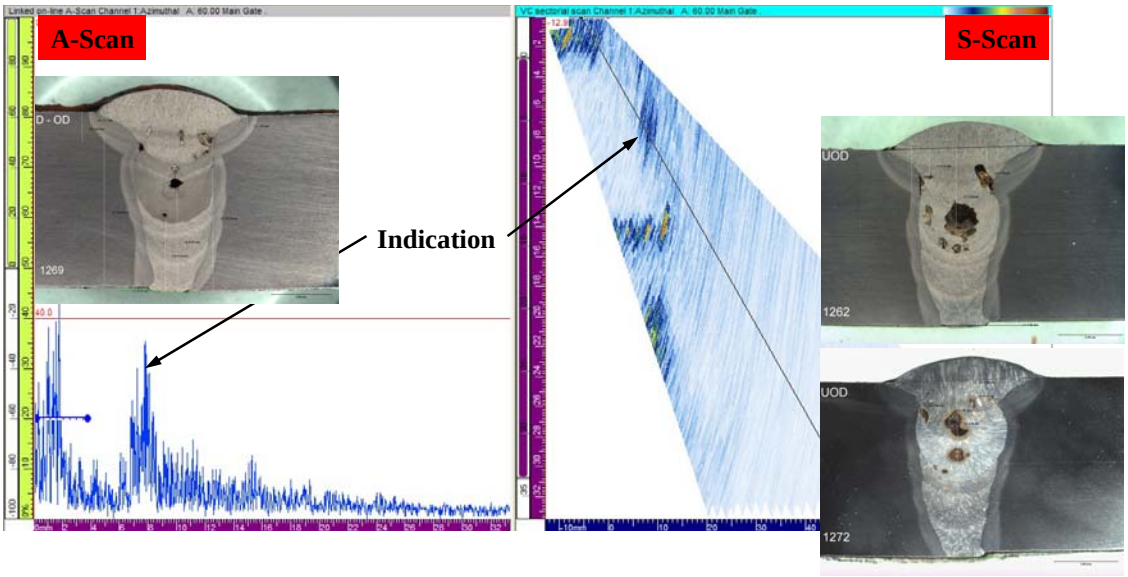
Location 1213 DS – PA7 60/16, FD 20



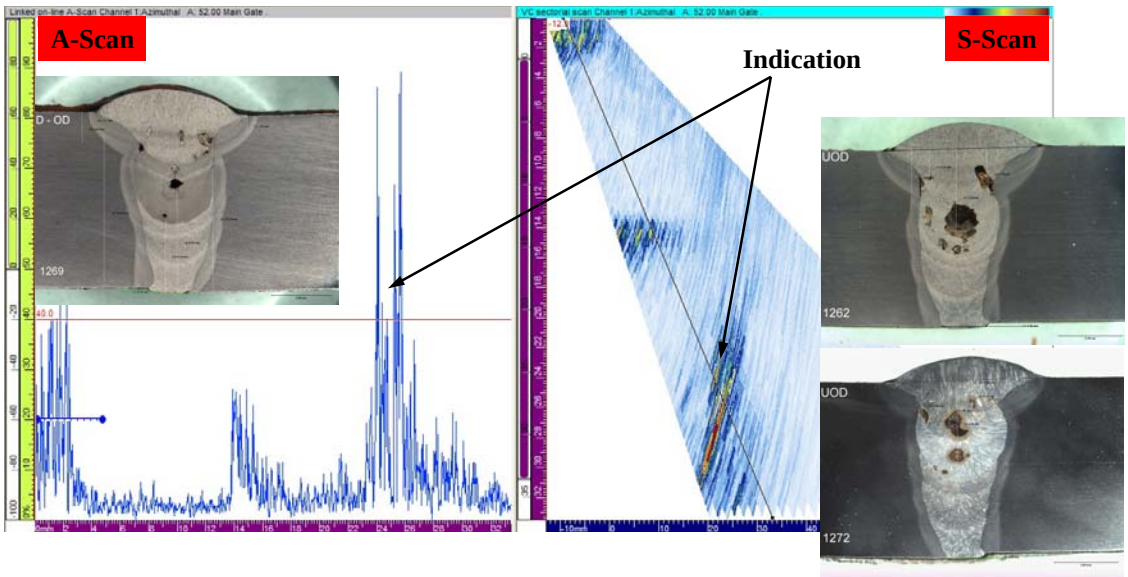
Location 1269 US – PA4 64/21, FD 20



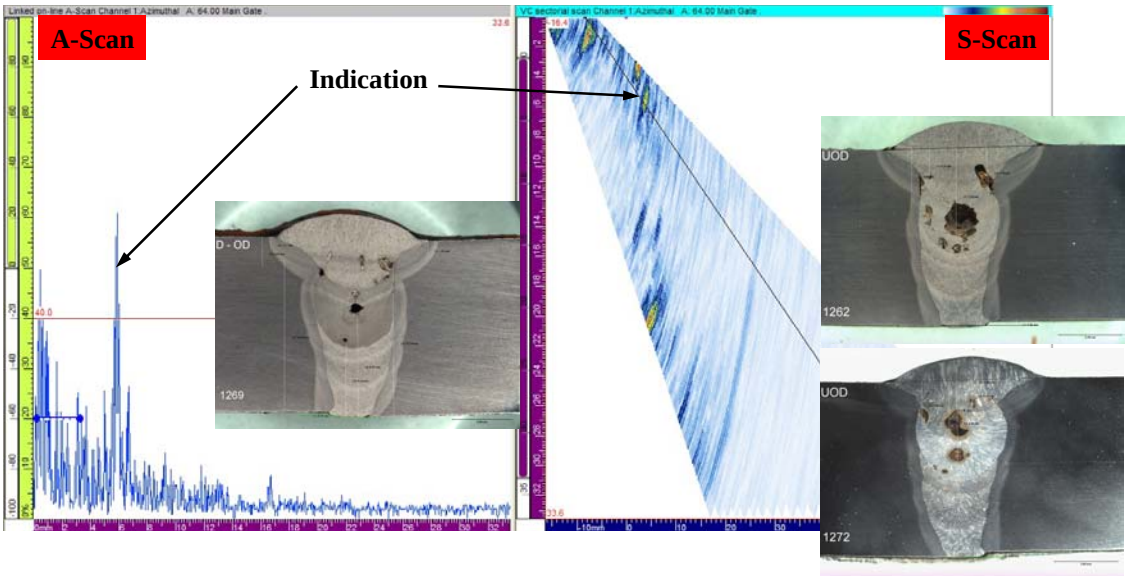
Location 1269 US – PA7 60/16, FD 20 (1st Leg)



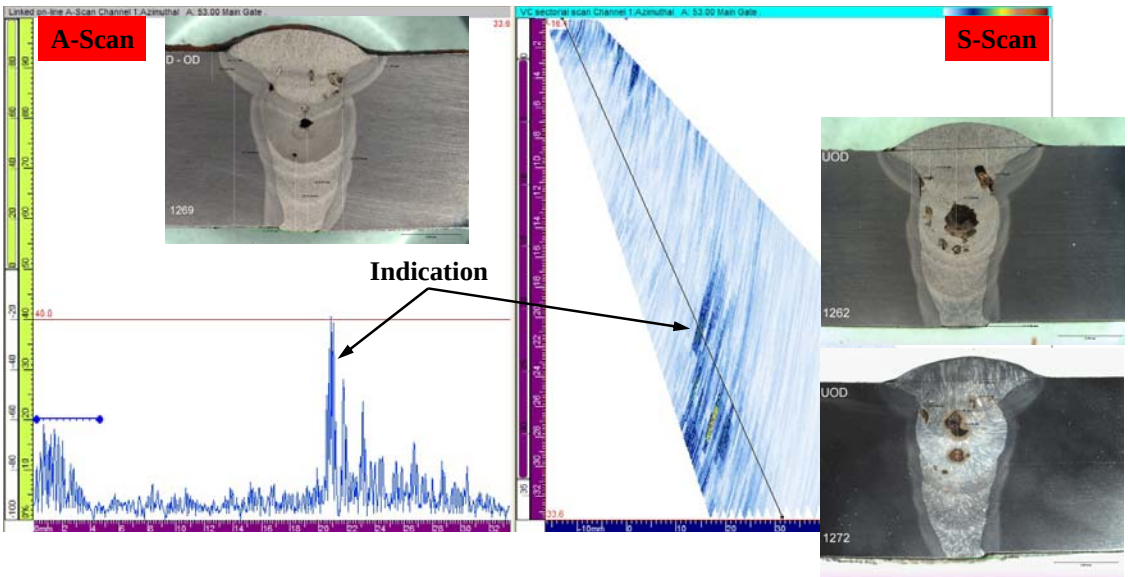
Location 1269 US – PA7 60/16, FD 20 (2nd Leg)



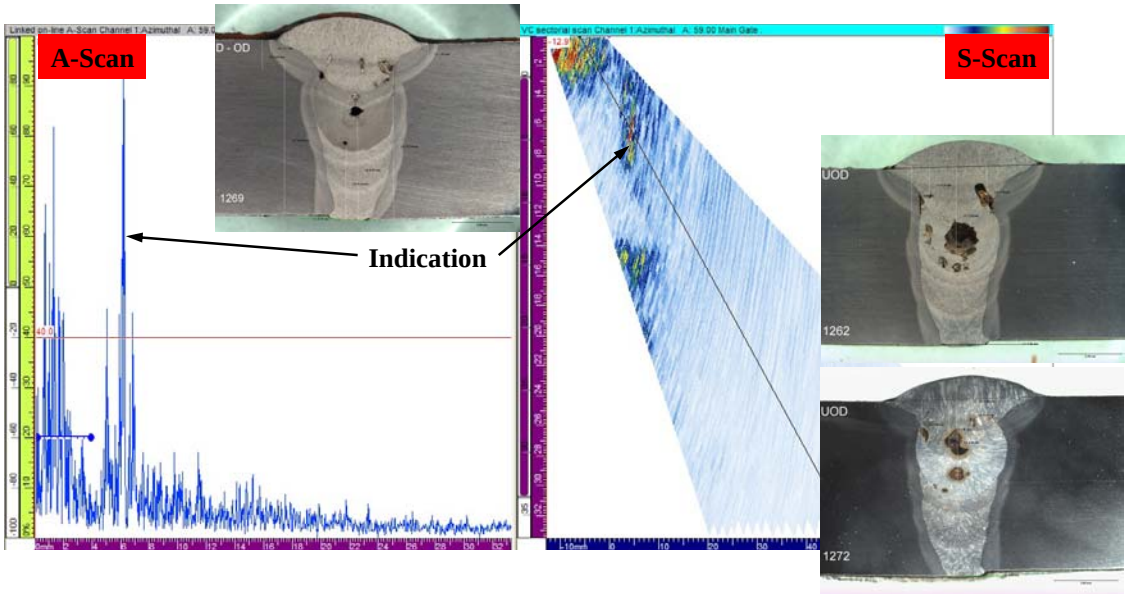
Location 1269 DS – PA4 64/21, FD 20 (1st Leg)



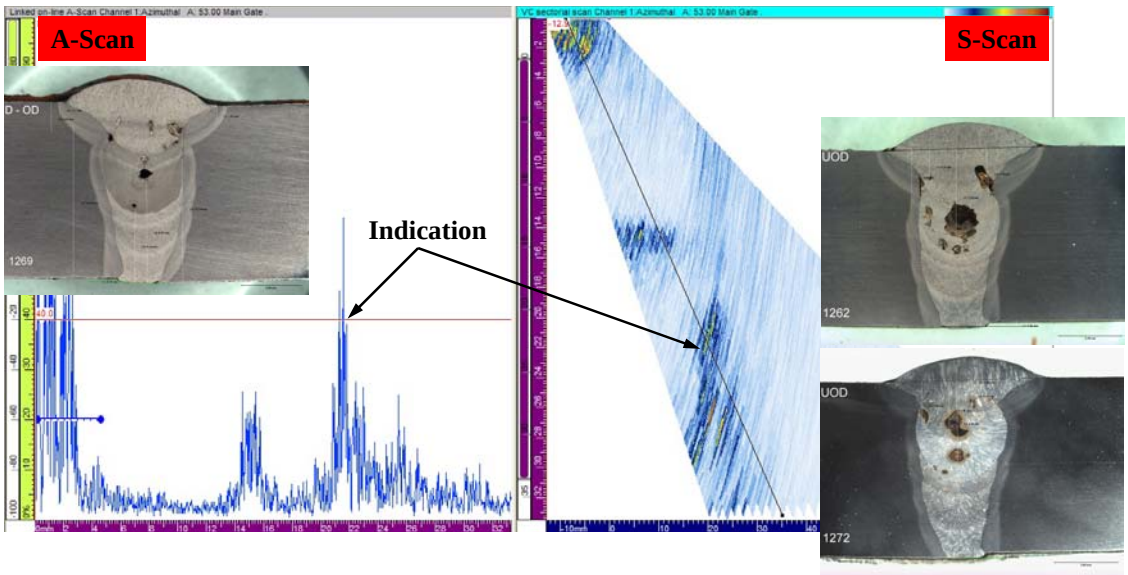
Location 1269 DS – PA4 64/21, FD 20 (2nd Leg)



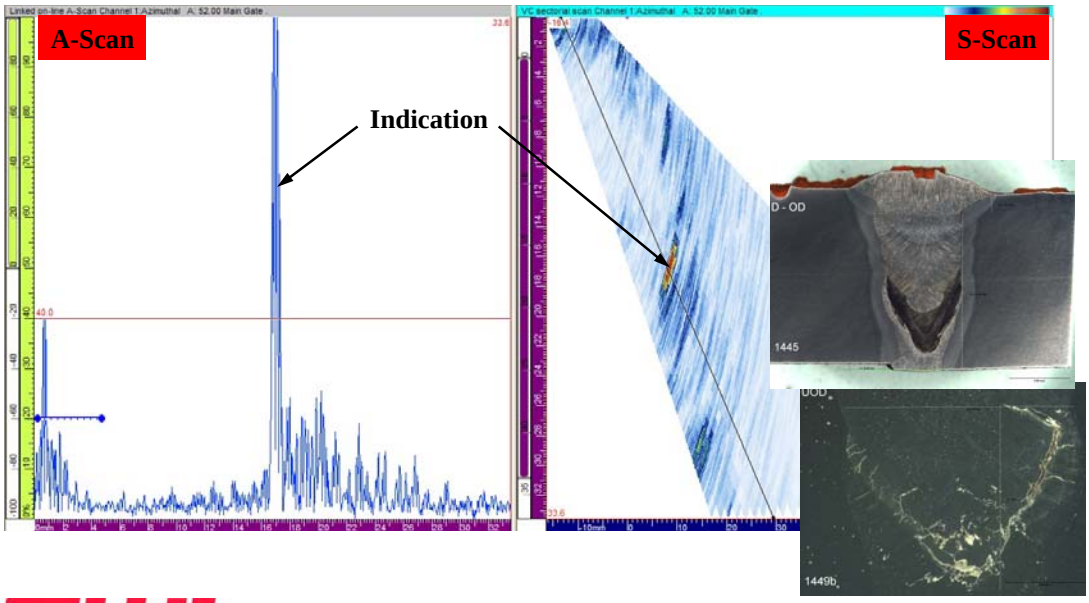
Location 1269 DS – PA7 60/16, FD 20 (1st Leg)



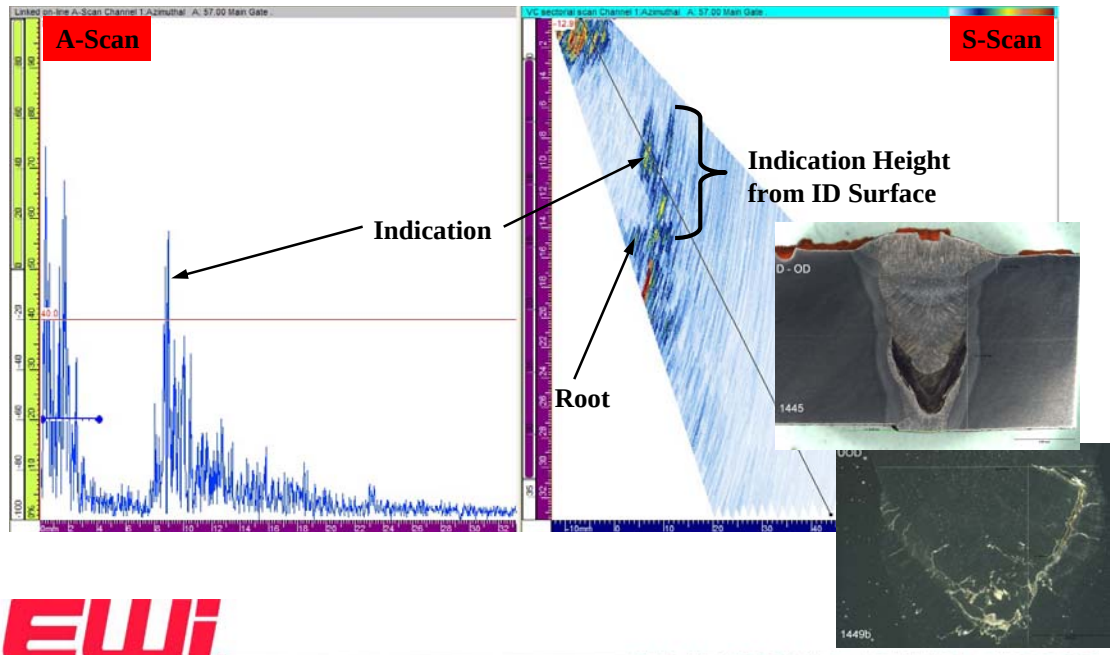
Location 1269 DS – PA7 60/16, FD 20 (2nd Leg)



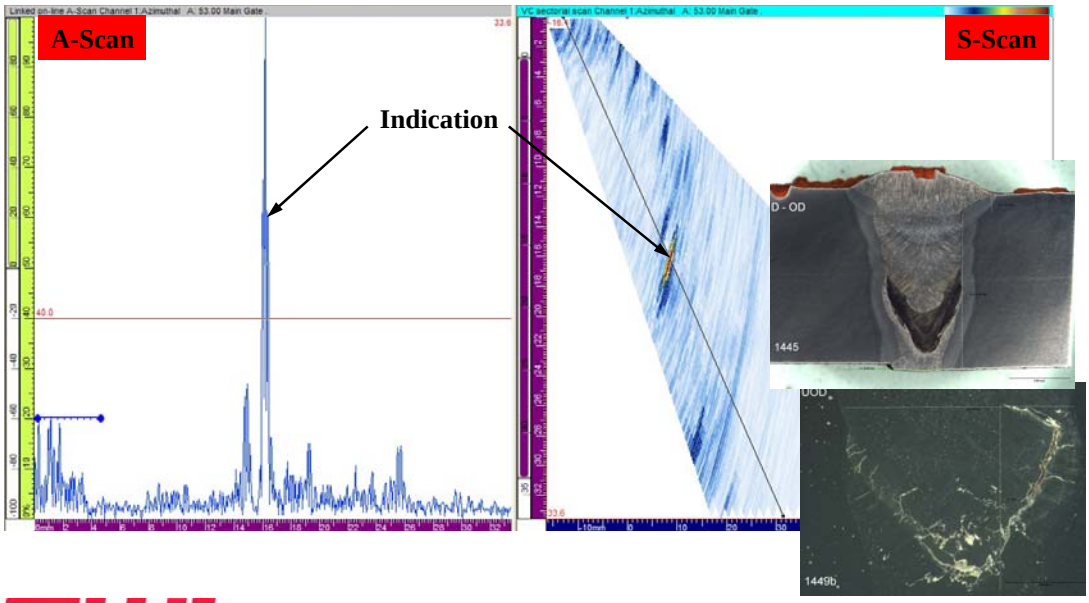
Location 1445 US – PA4 64/21, FD 20



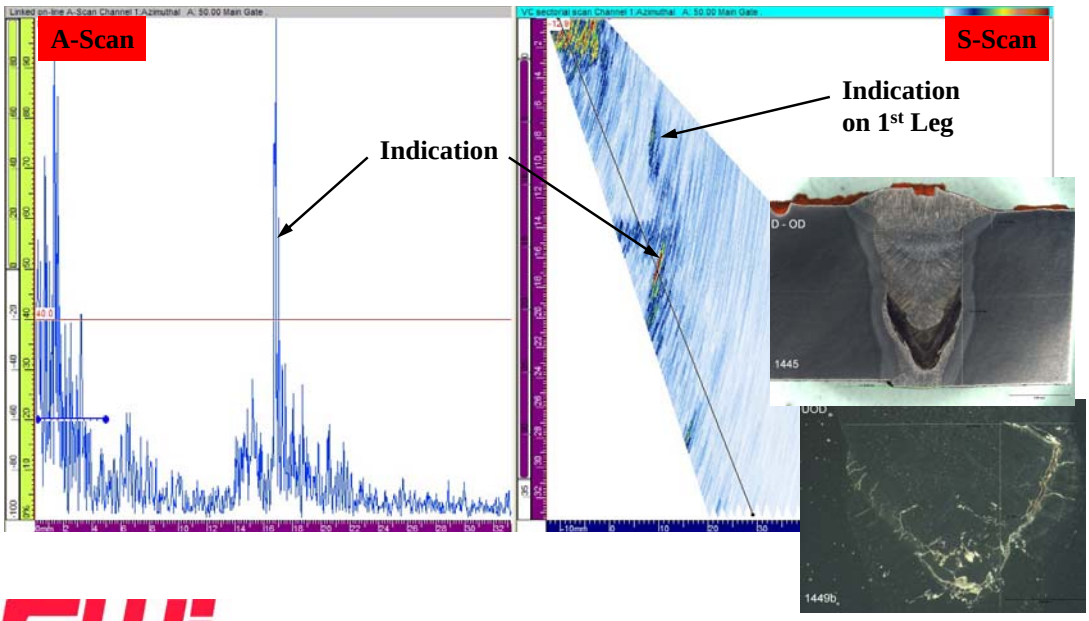
Location 1445 US – PA7 60/16, FD 20



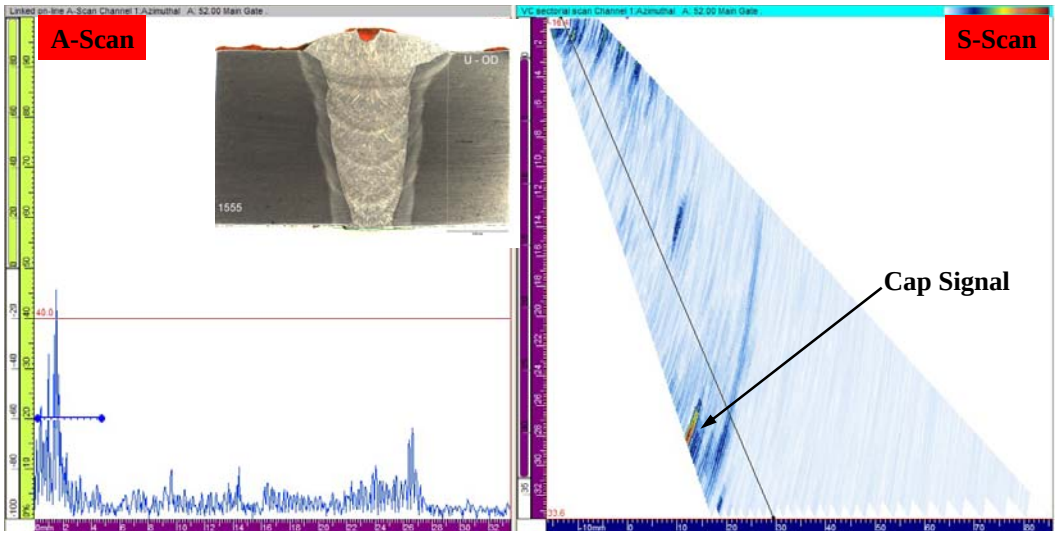
Location 1445 DS – PA4 64/21, FD 20



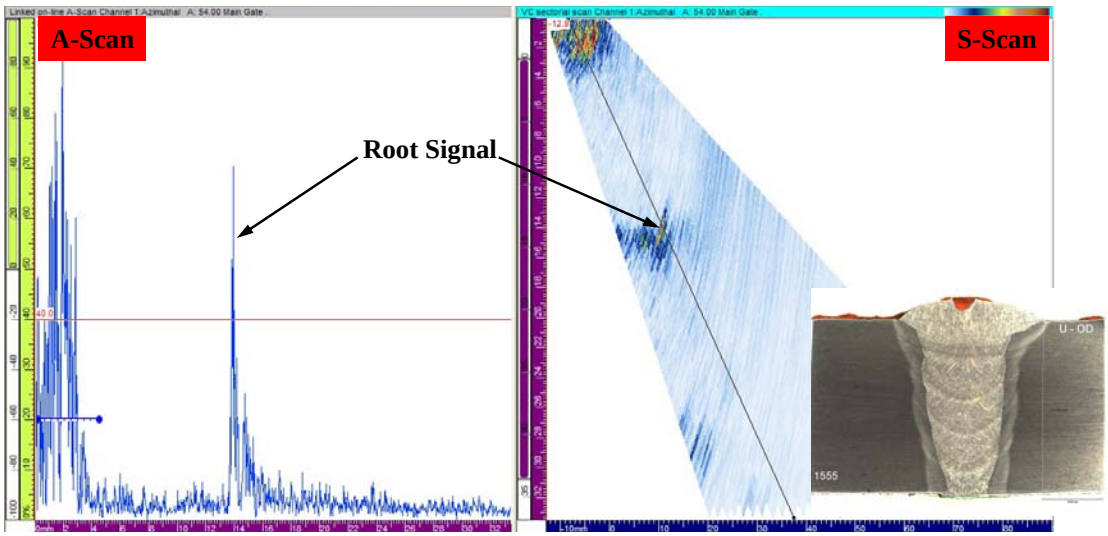
Location 1445 DS – PA7 60/16, FD 20



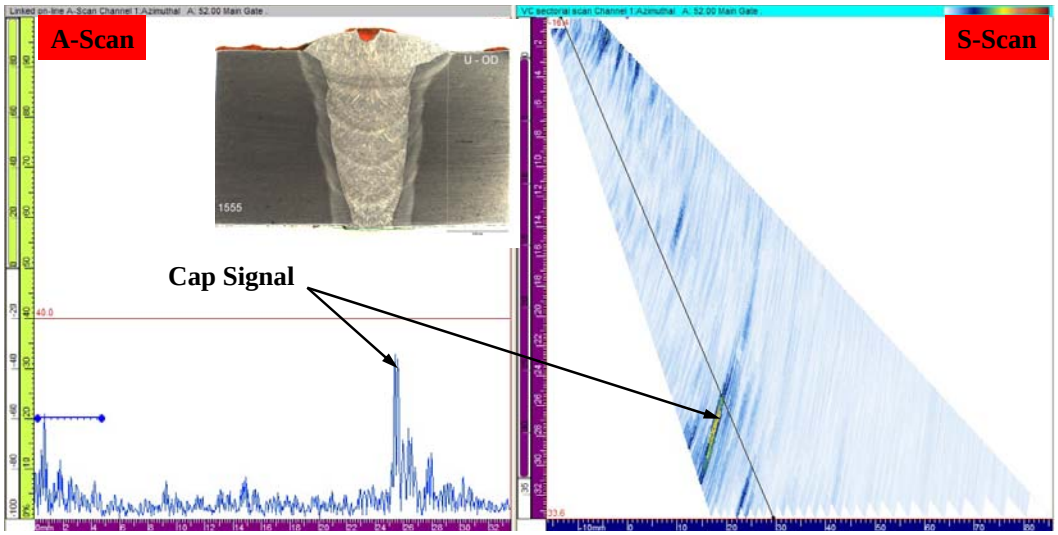
Location 1555 US (No Flaw) – PA4 64/21, FD 20



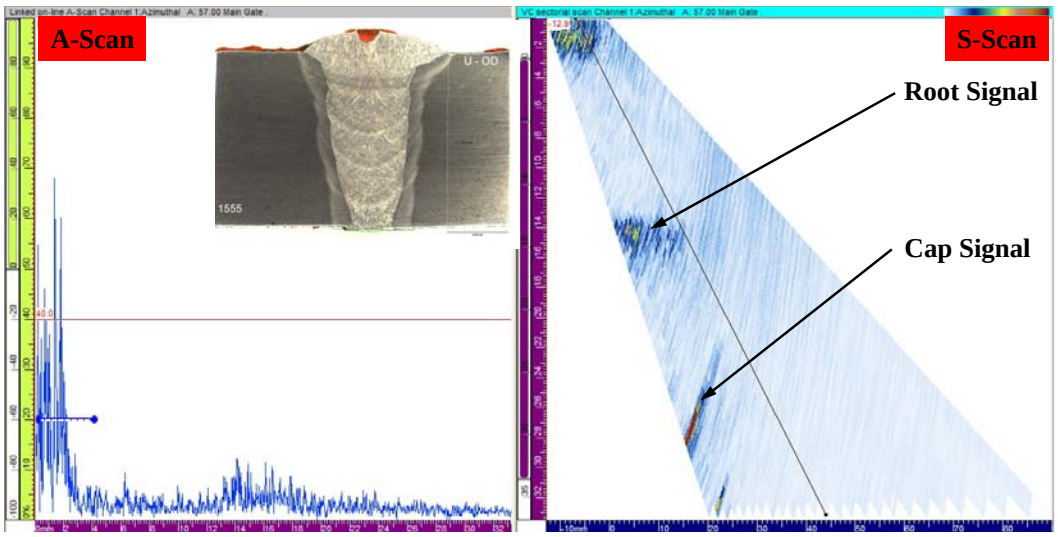
Location 1555 US (No Flaw) – PA7 60/16, FD 20



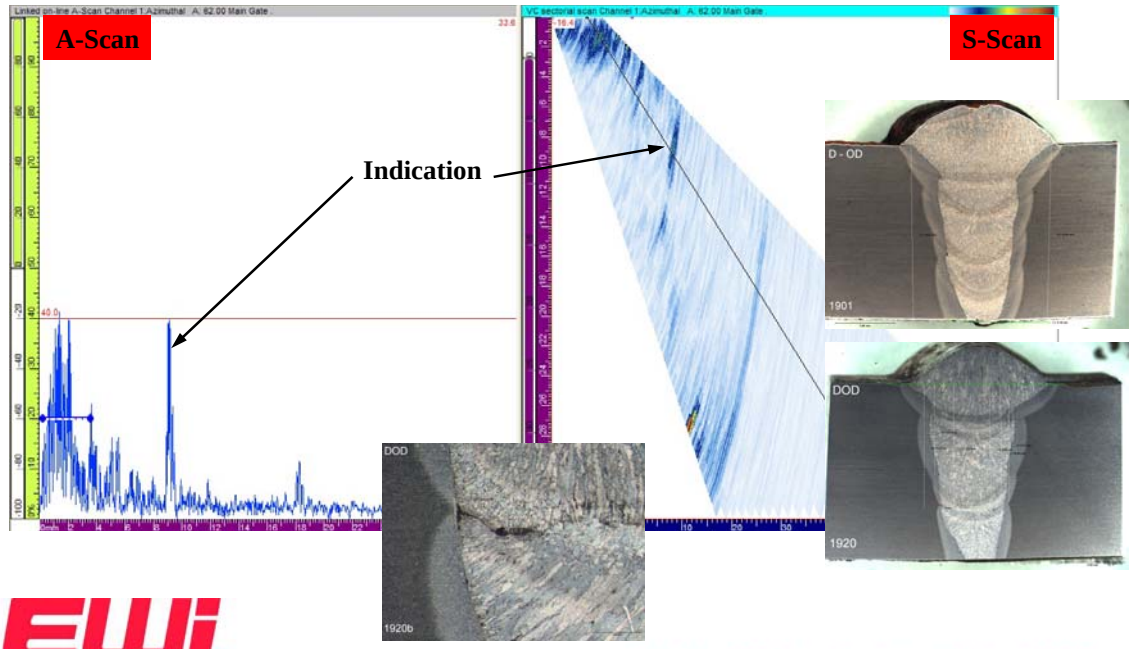
Location 1555 DS (No Flaw) – PA4 64/21, FD 20



Location 1555 DS – PA7 60/16, FD 20

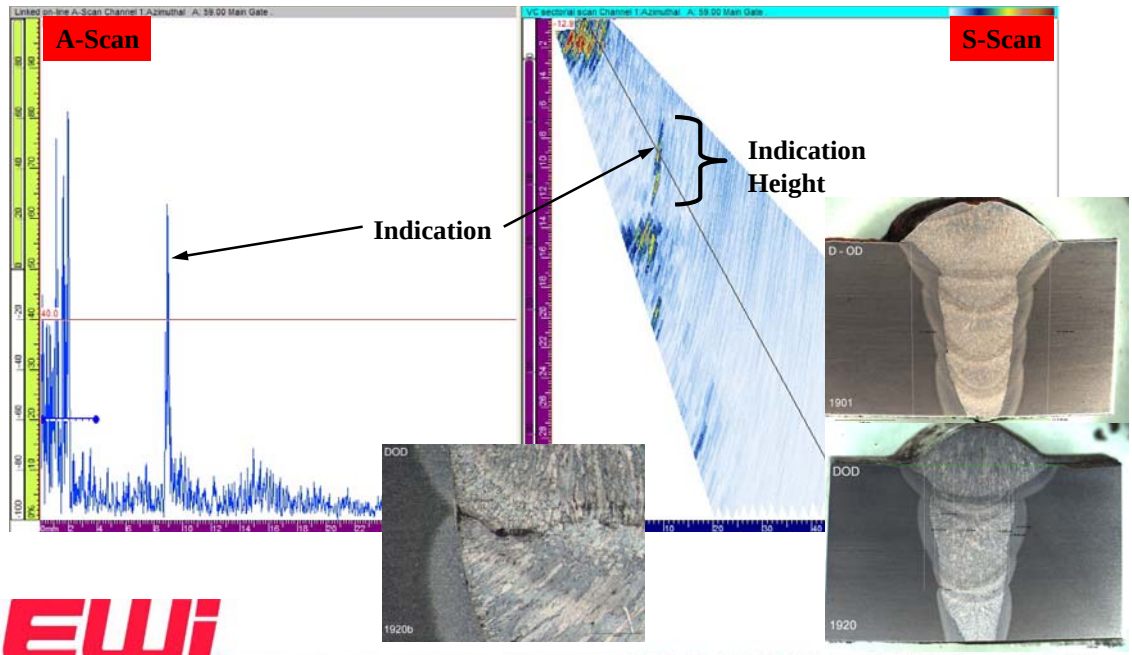


Location 1901 US – PA4 64/21, FD 20



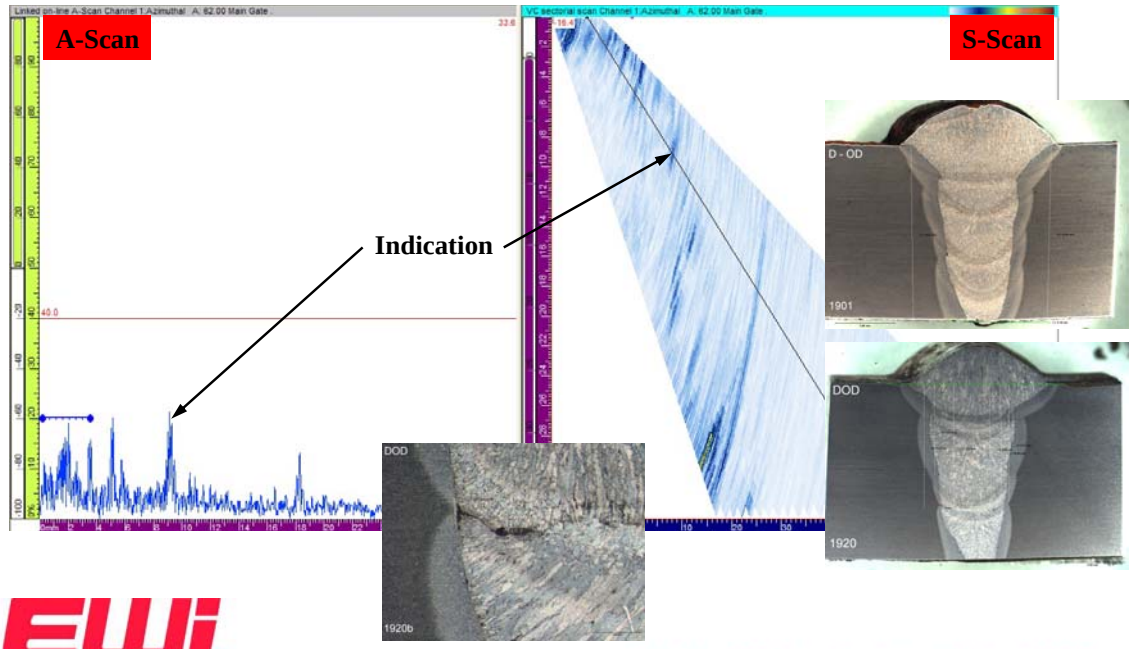
THE MATERIALS JOINING EXPERTS

Location 1901 US – PA7 60/16, FD 20



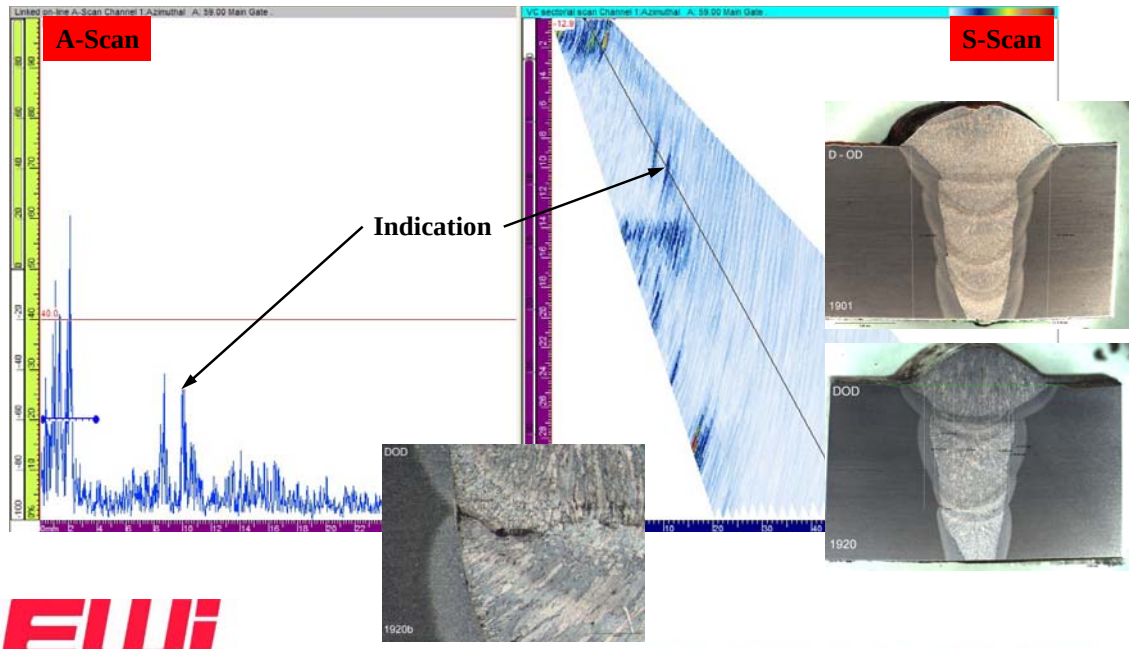
THE MATERIALS JOINING EXPERTS

Location 1901 DS – PA4 64/21, FD 20



THE MATERIALS JOINING EXPERTS

Location 1901 DS – PA7 60/16, FD 20



THE MATERIALS JOINING EXPERTS