Worldwide patented PA UT

Automated UT Industrial applications

FAAST-PA delivers high speed inspection for Tubes, Plates, Bars/Billets, Rail, Turbine discs and more…

CINDE
CANADIAN INSTITUTE FOR NON-DESTRUCTIVE EVALUATION

Speaker: Chris Chollet

NDT in Canada
NDTiC 2019
Inform - Engage - Advance

June 18 - 20
River Cree Resort & Casino
Edmonton, Alberta

SUMMARY

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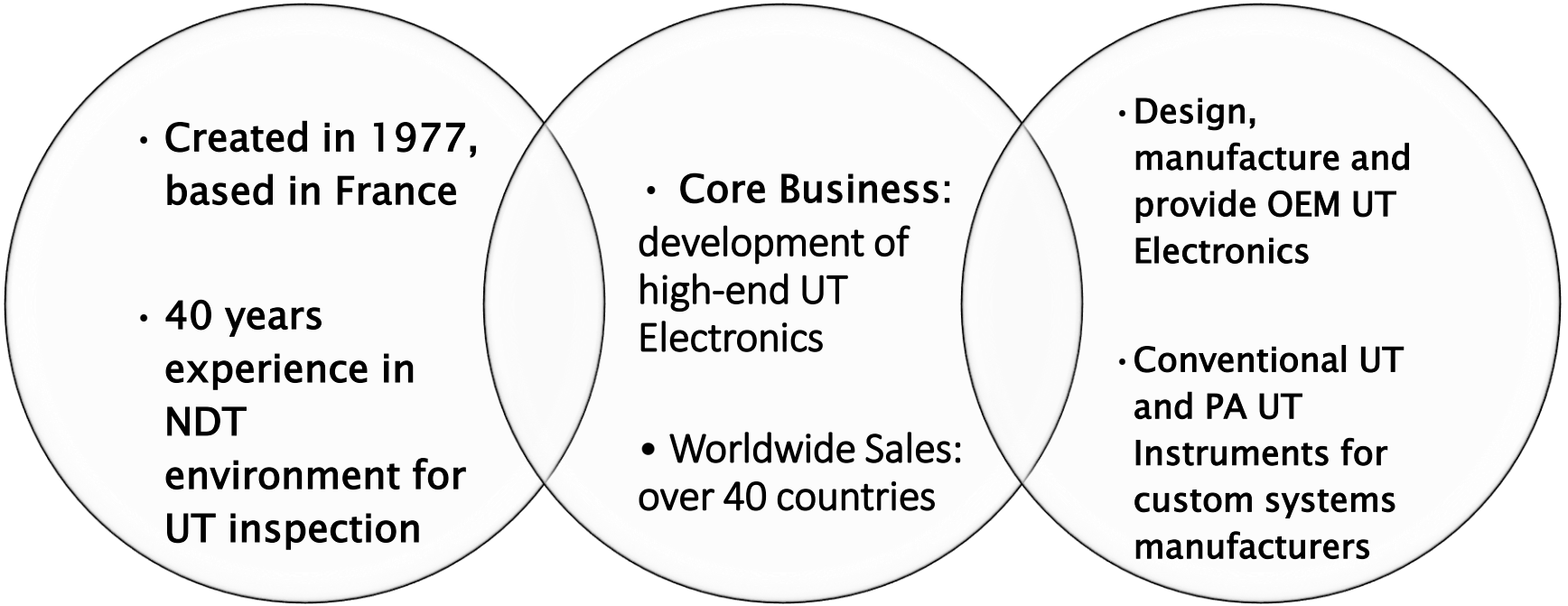
III

Industrial references using FAAST-PA

Socomate International overview



Socomate International product range

SOCO-1-UT

SOCO-8S-UT

SOCO-8P-UT

SOCOSCAN-PA

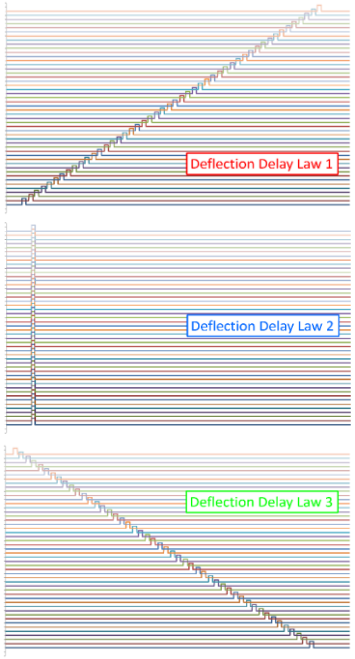
FAAST-PA

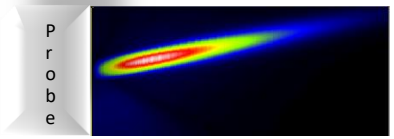
Common DLL for Conventional and PA UT working with any languages on Windows 7 and 10

OEM stand alone products, working with Ethernet connection

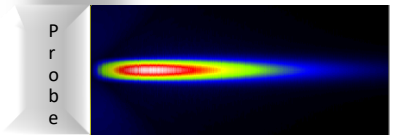
Worldwide patent on FAAST-PA

What are the differences between Conventional PA and FAAST-PA ?

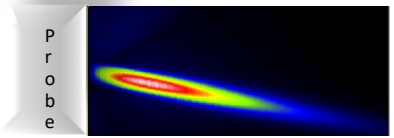




Shot 1 – Angle 1

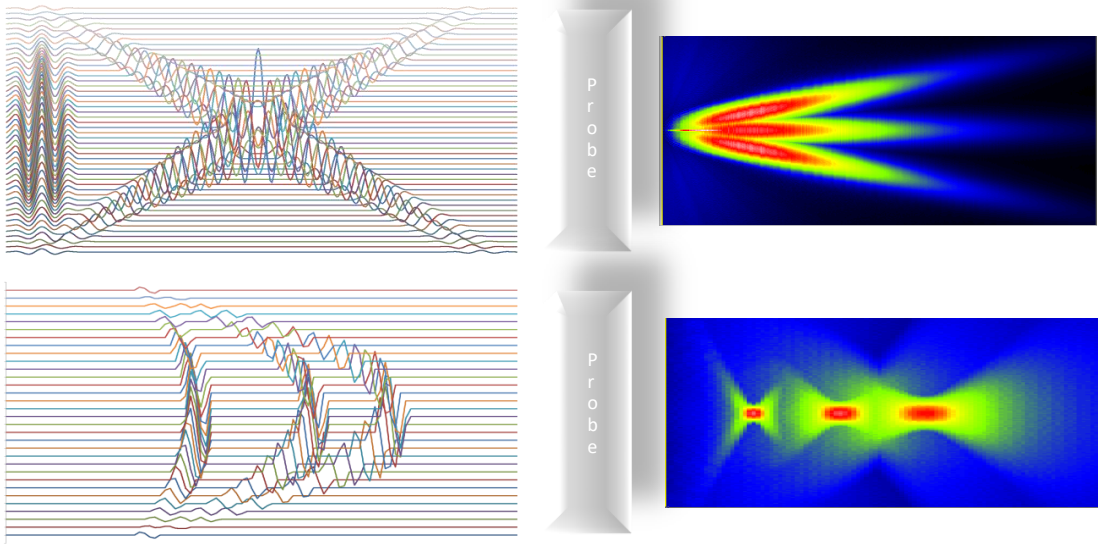


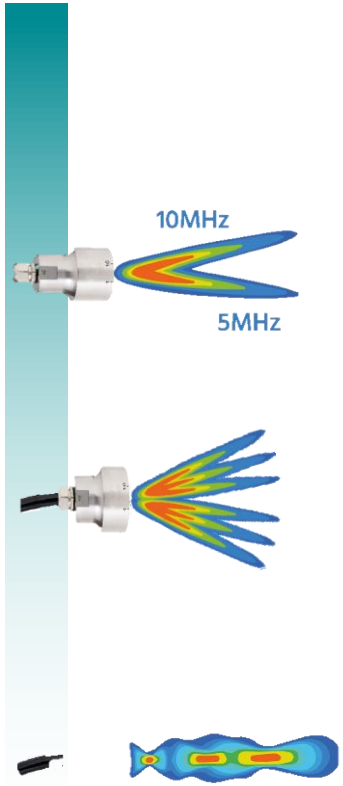
Shot 2 – Angle 2



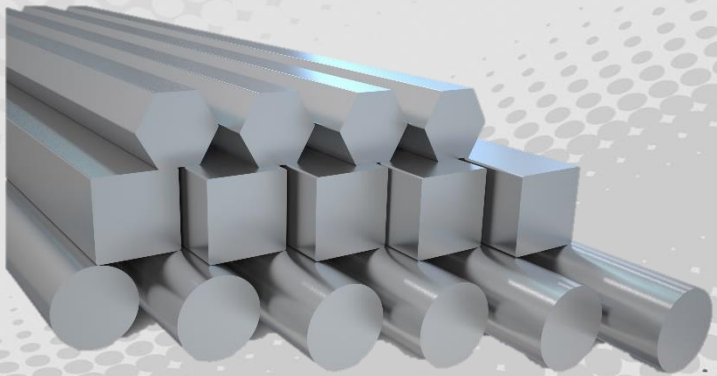
Shot 3 – Angle 3

What are the differences between Conventional PA and FAAST-PA ?



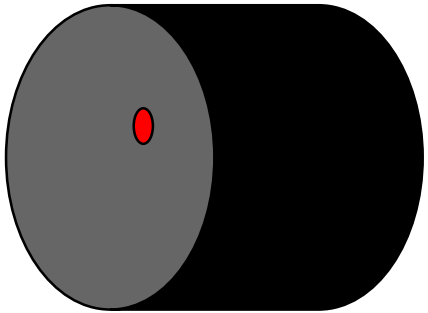


Bars and Billets Inspection using FAAST-PA

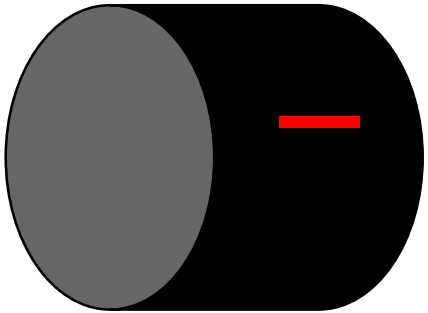


Bars/Billets Inspection - Context

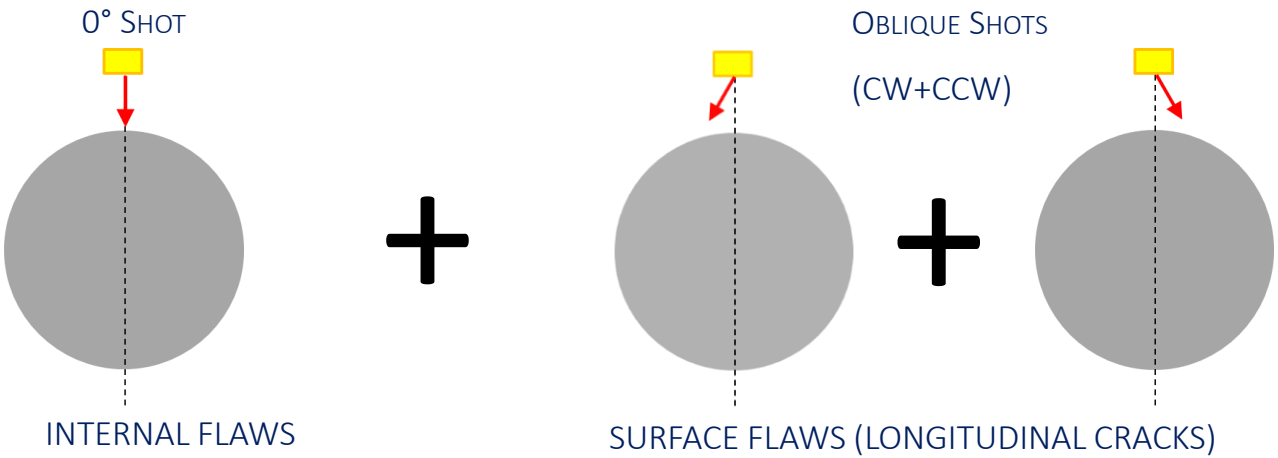
INTERNAL FLAWS



SURFACE FLAWS (LONGITUDINAL CRACKS)



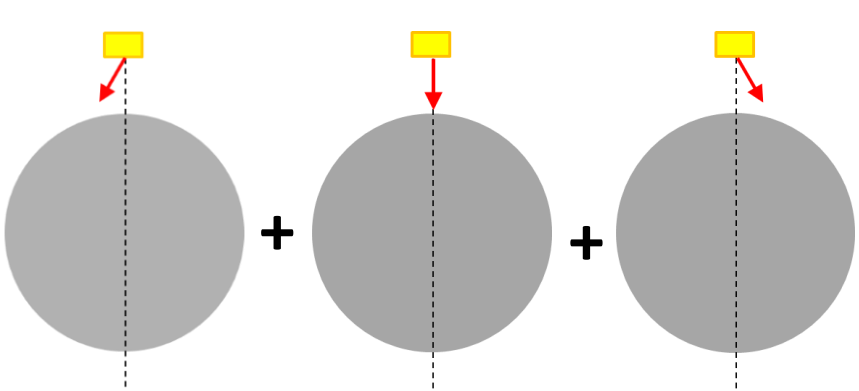
Bars/Billets Inspection – Inspection's Principles

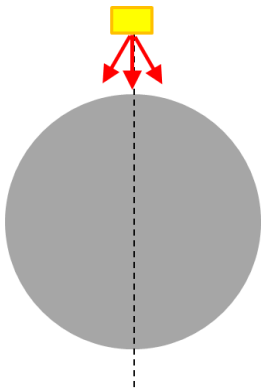


- A CONVENTIONAL PHASED ARRAY INSTRUMENT WILL REQUIRE 3 SEQUENTIAL SHOTS TO COVER THE FULL INSPECTION

Bars/Billets Inspection – FAAST-PA Solution

- FAAST-PA Inspection : Only ONE SHOT is required for multiple angles

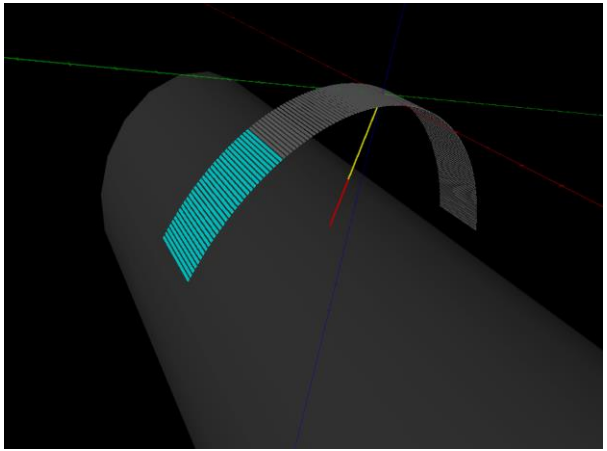


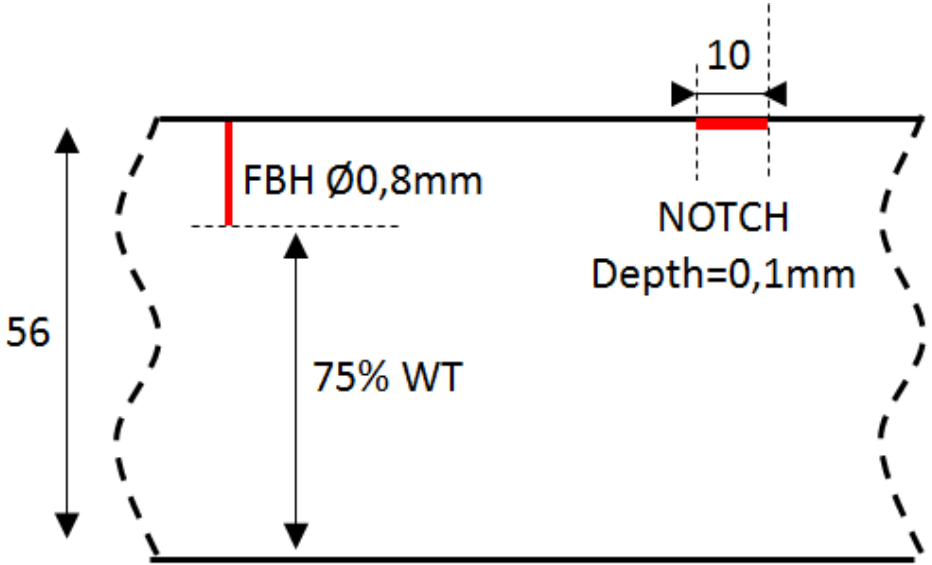


Multi-Angle Shot

- In this configuration, FAAST acquisition is 3 TIMES FASTER than Conventional PA

Bars/Billets Inspection – Comparison between solutions

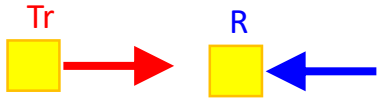




USE OF A 1D LINEAR PROBE R60

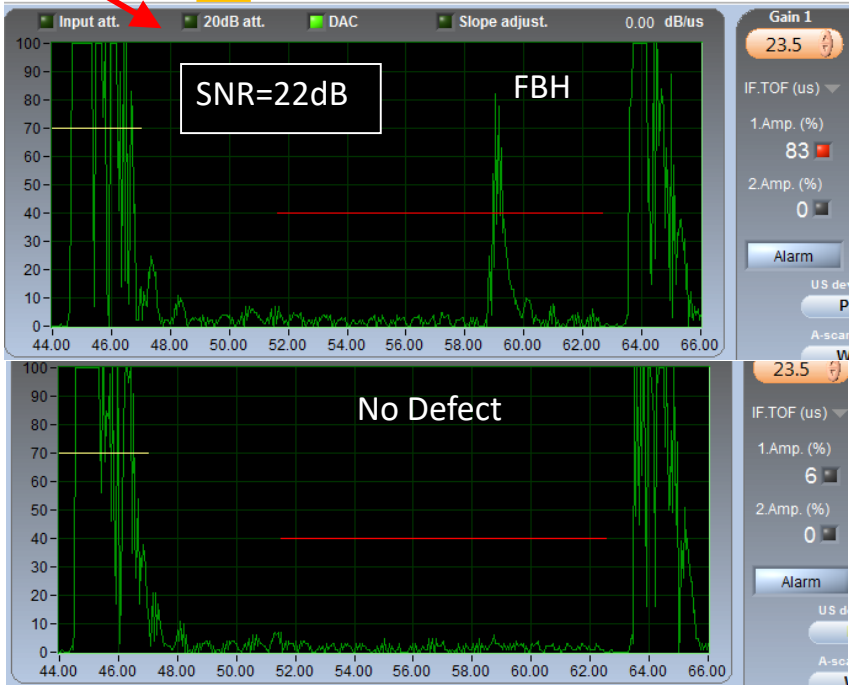
Bars/Billets Inspection – Comparison between solutions

FBH detection



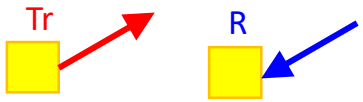
CONVENTIONAL PA

FAAST MULTI-ANGLE SHOT

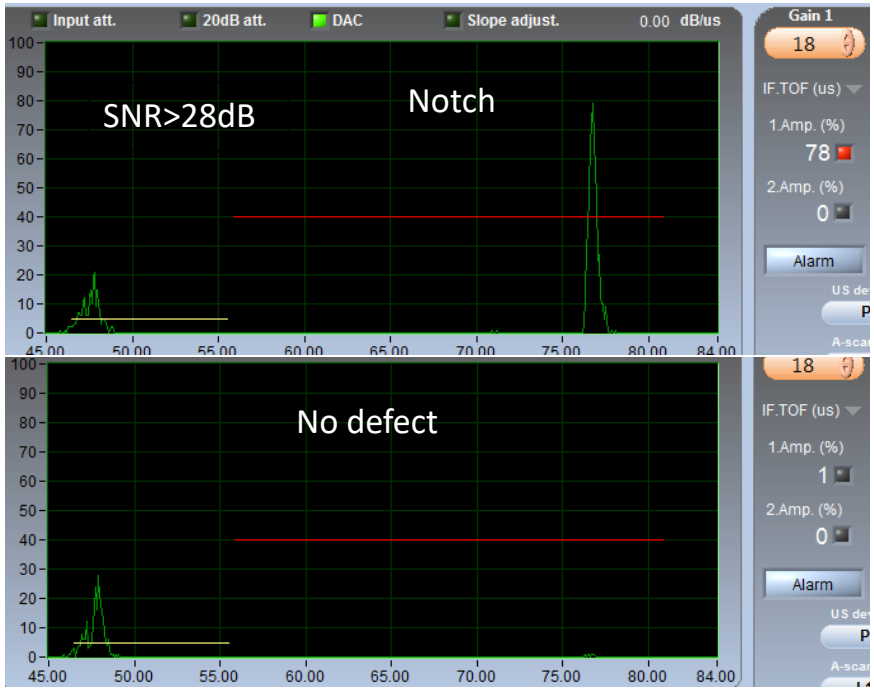


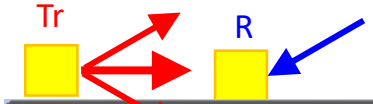
Bars/Billets Inspection – Comparison between solutions

Notch detection



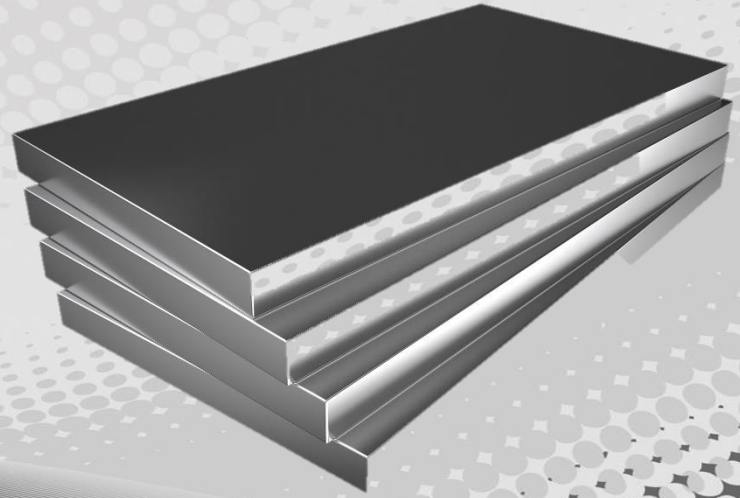
CONVENTIONAL PA





FAAST MULTI-ANGLE SHOT

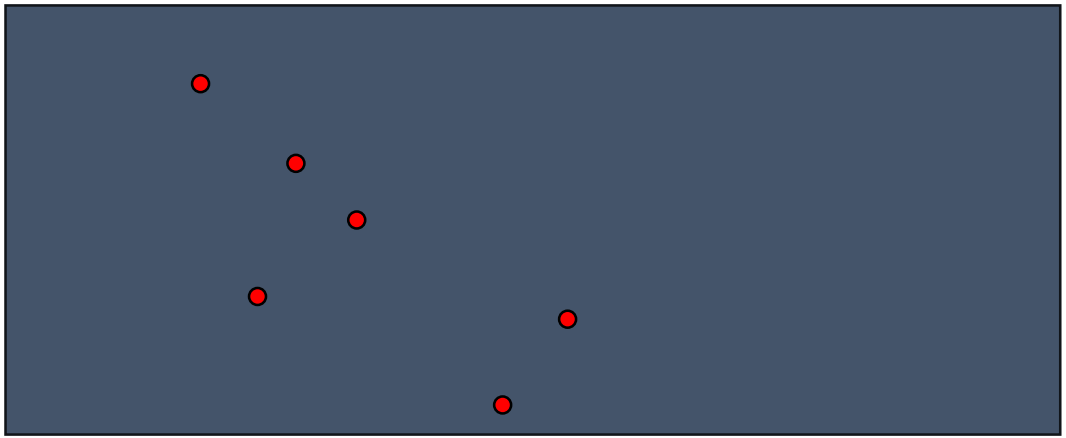
Titanium Plate Inspection using FAAST-PA



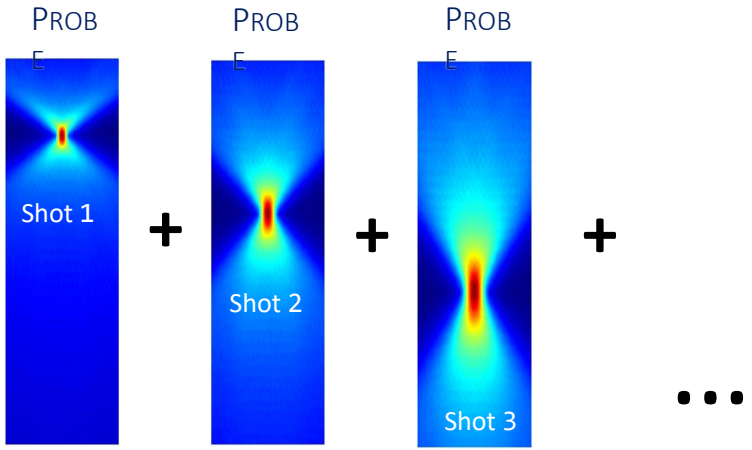
Titanium Plate– Context

- Material: Titanium TA6V
- Probe: 1D Linear PA, 10MHz

- Detection of flaws at different depths
- Looking for 0,8mm FBH
- From 15mm to 185mm with defects at : 15, 25, 40, 80, 135, 185



Titanium Plate– Inspection using conventional PA

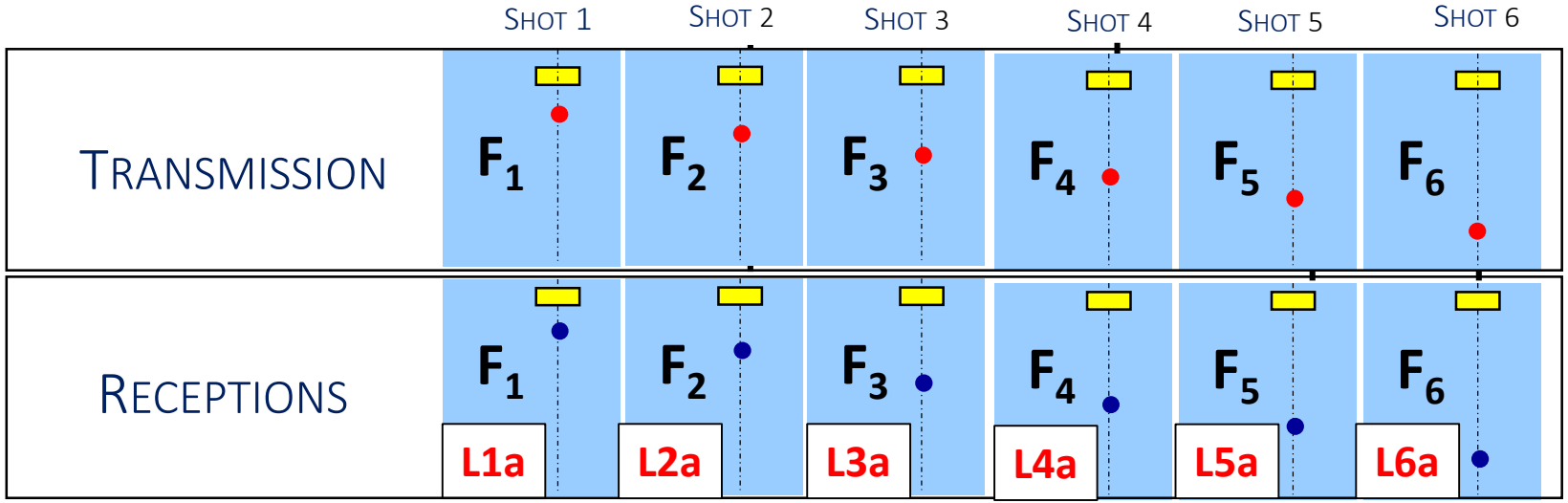


- THE PRINCIPLE OF CONVENTIONAL PA IS THE USE OF DIFFERENT US FOCUSED BEAM FOR EACH ZONE
- THIS REQUIRE SEVERAL SEQUENTIAL SHOTS WHICH LEAD TO TIME CONSUMING

Titanium Plate– Inspection using conventional PA

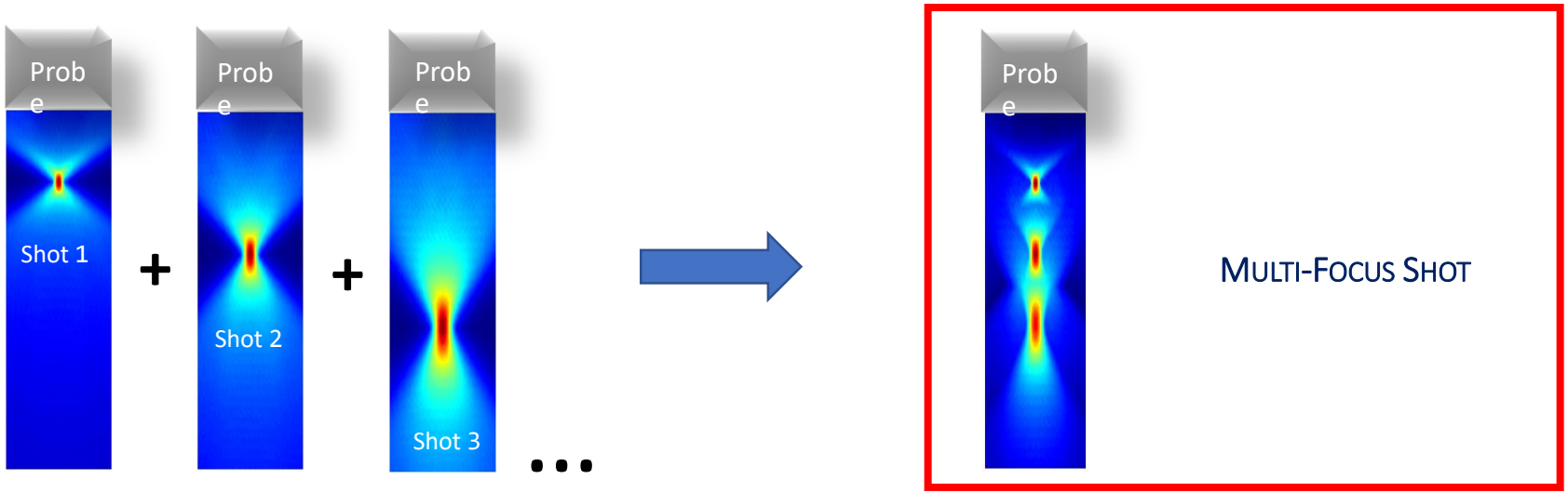
SEQUENTIAL UNIFOCAL SHOTS

FI = OPTIMAL FOCALE FOR FBH N° I



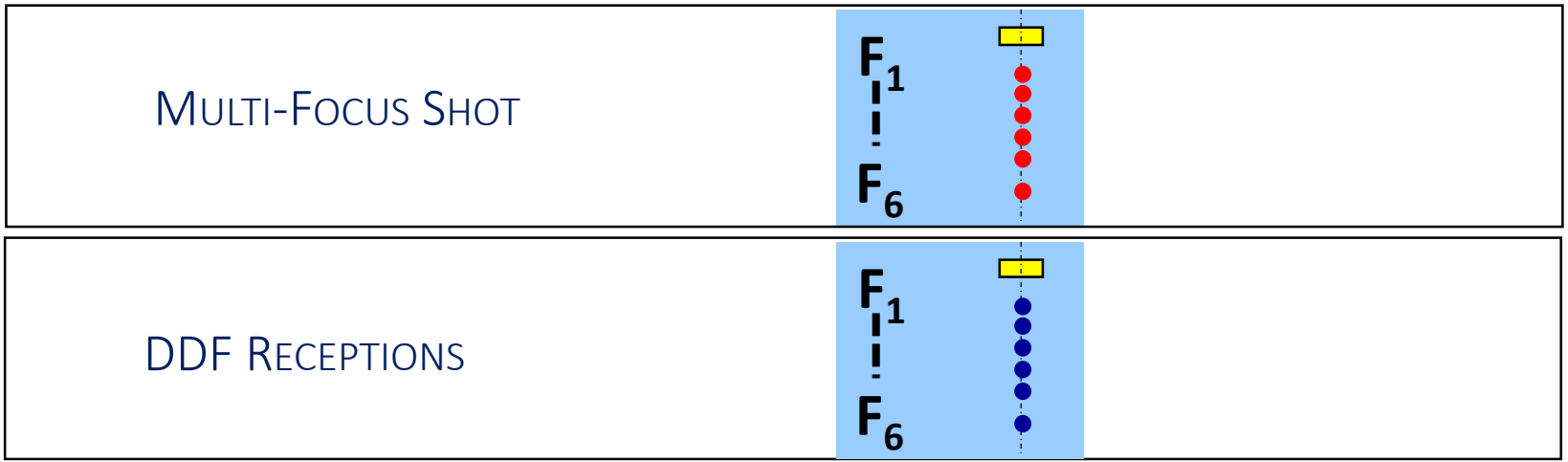
Titanium Plate– Inspection using FAAST-PA

- Based on FAAST-PA, one shot is required for multiple depth focusing

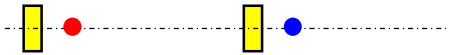


Titanium Plate– Inspection using FAAST-PA

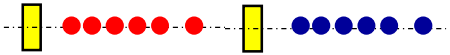
- Example of FAAST-PA using Multiple focal within 1 US Shot
- Multi-Focus Transmission + DDF Reception ▶ **Advanced DDF**



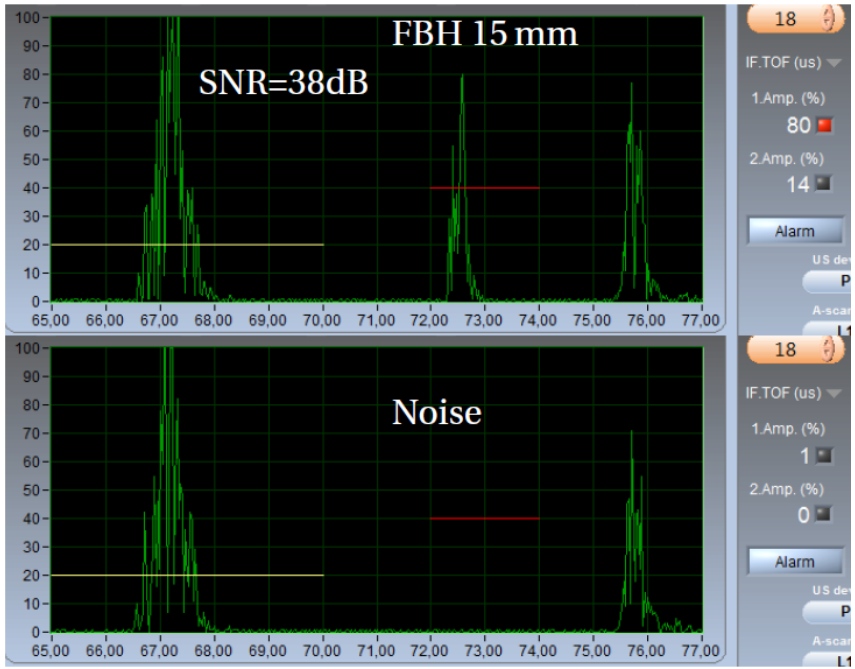
Titanium Plate– Results Comparison

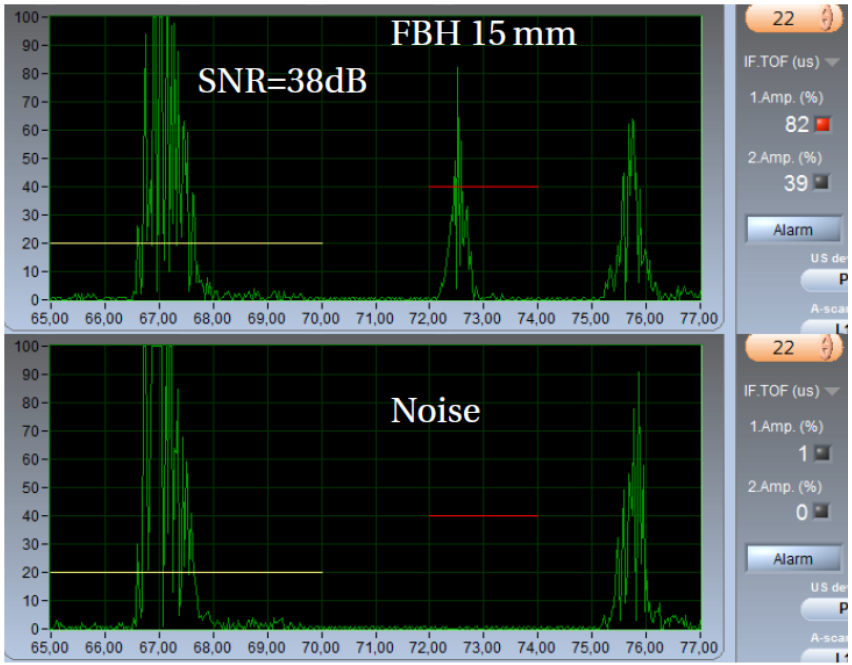


CONVENTIONAL PA



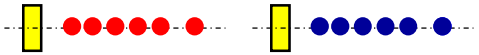
FAAST ADVANCED DDF



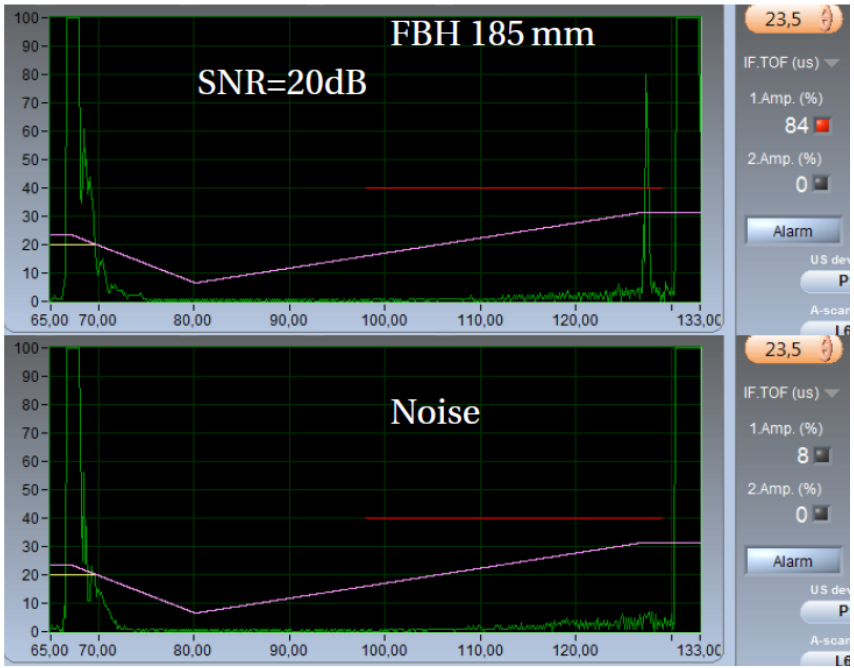


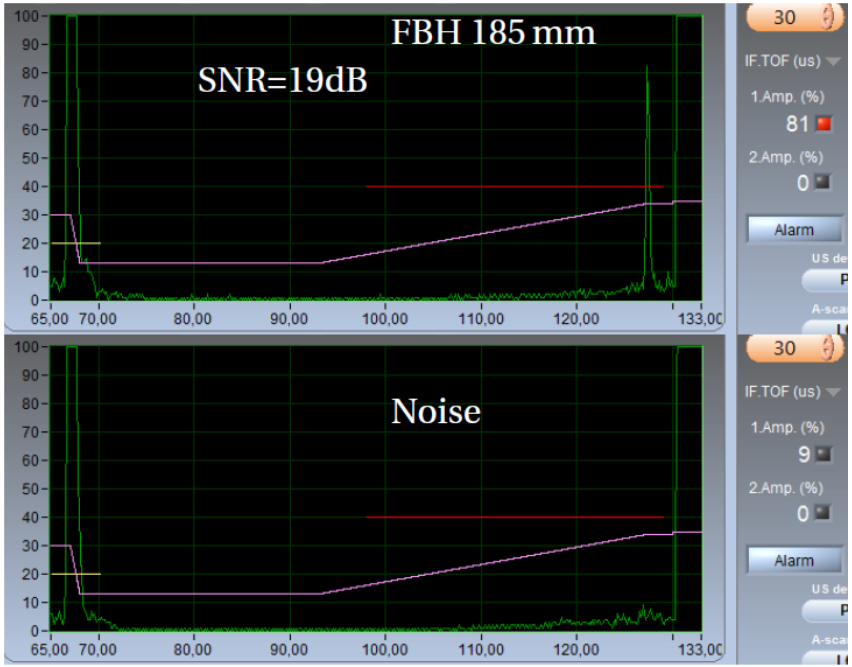
Titanium Plate– Results Comparison

CONVENTIONAL PA

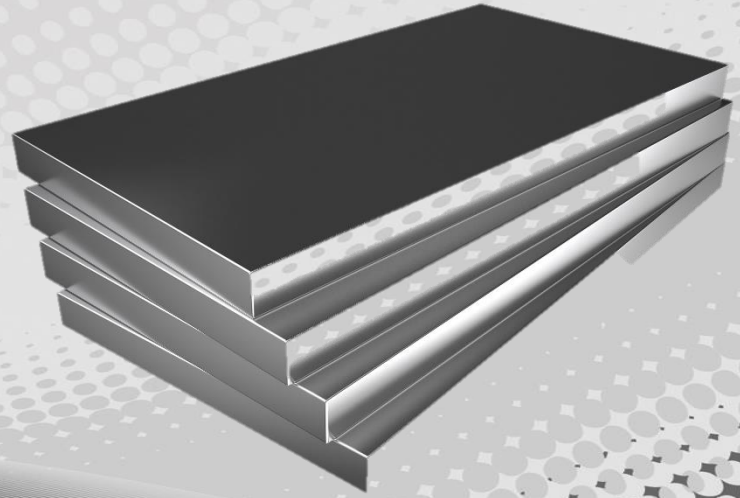


FAAST ADVANCED DDF





Aluminium Plate Inspection using FAAST-PA



Aluminium Plate– Context

Mechanical scanning speed: 700mm/s

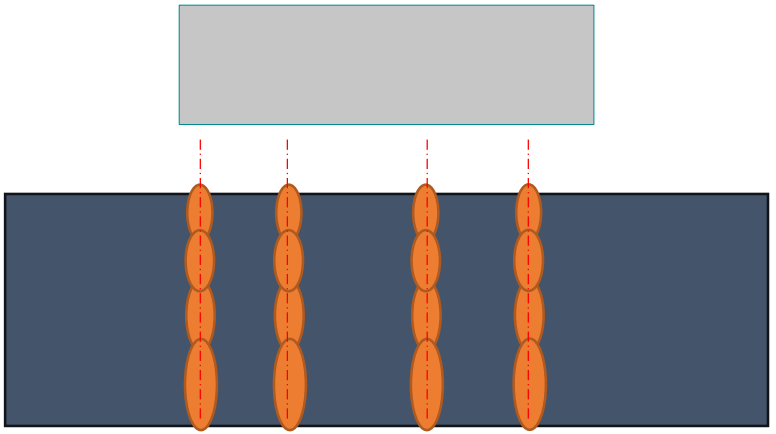
Maximum PRF 800Hz (limited by ghost echoes)

Pitch: 1mm with 3 dB repeatability

Specification:

1,2mm FBH

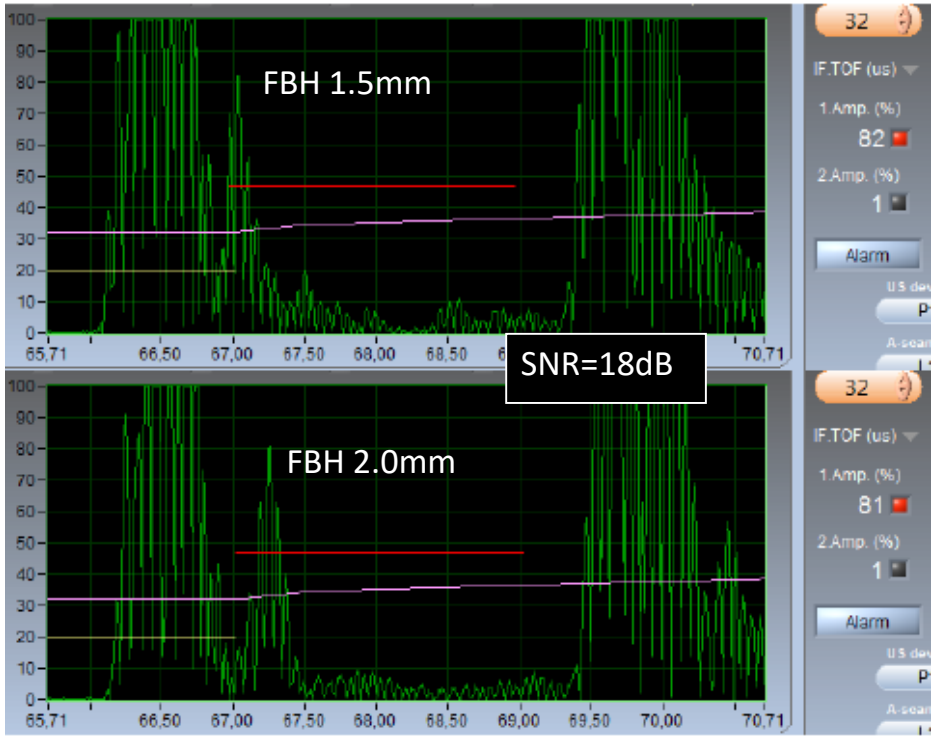
From 1,5mm to 190mm



Aluminium Plate– Laboratory results

- ALUMINIUM BLOC TEST WITH FBH Ø1.2MM

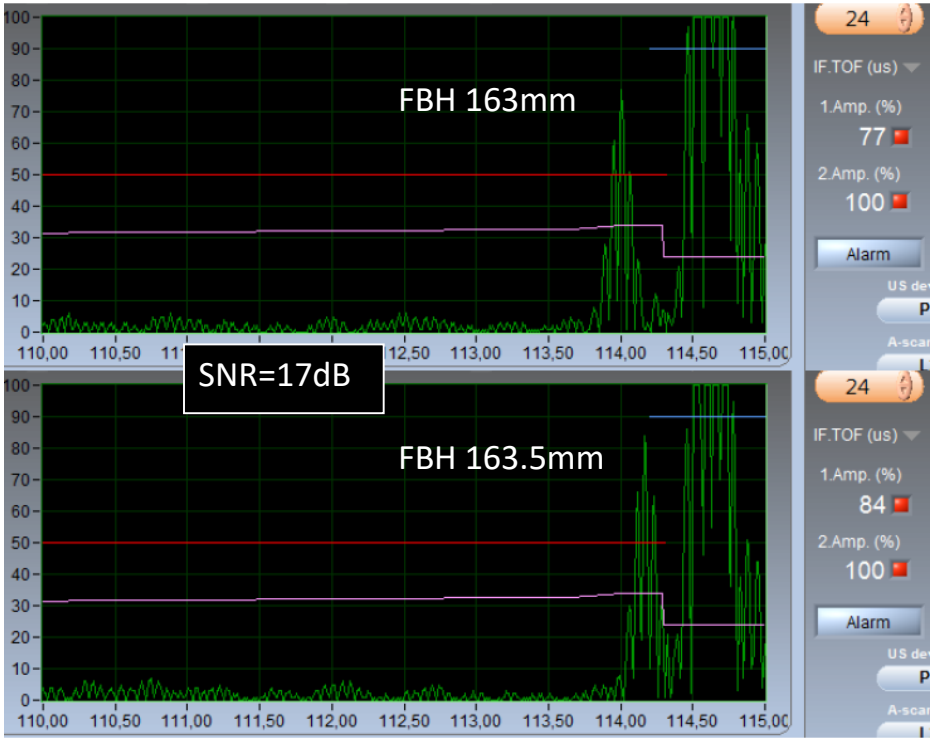
NEAR ZONE DETECTION



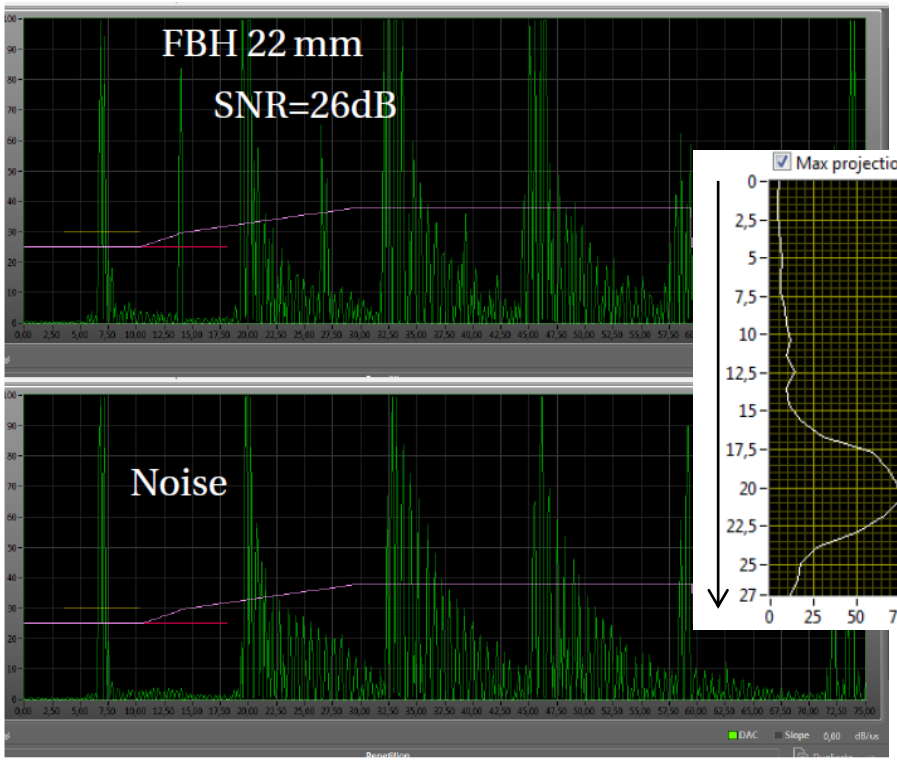
Aluminium Plate– Laboratory results

- ALUMINIUM BLOC TEST WITH FBH Ø1.2MM

DEEP ZONE DETECTION

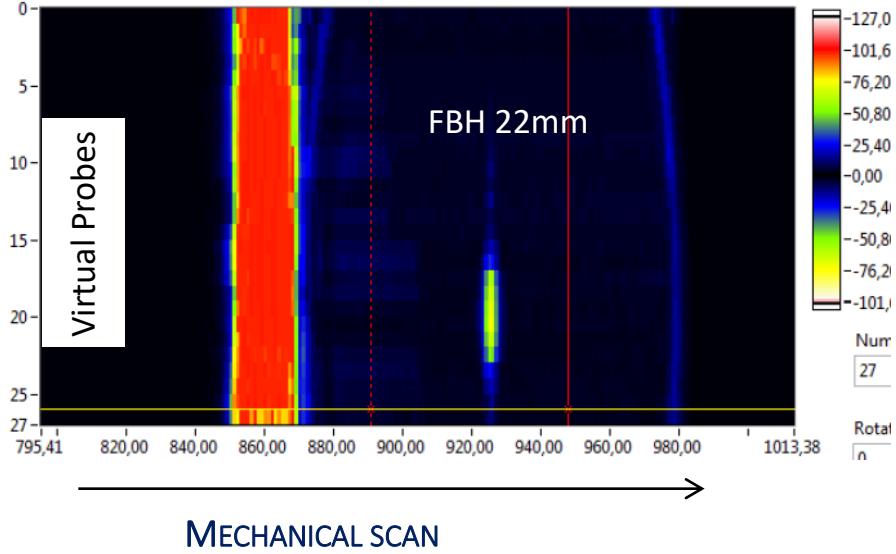


Aluminium Plate – On-site results

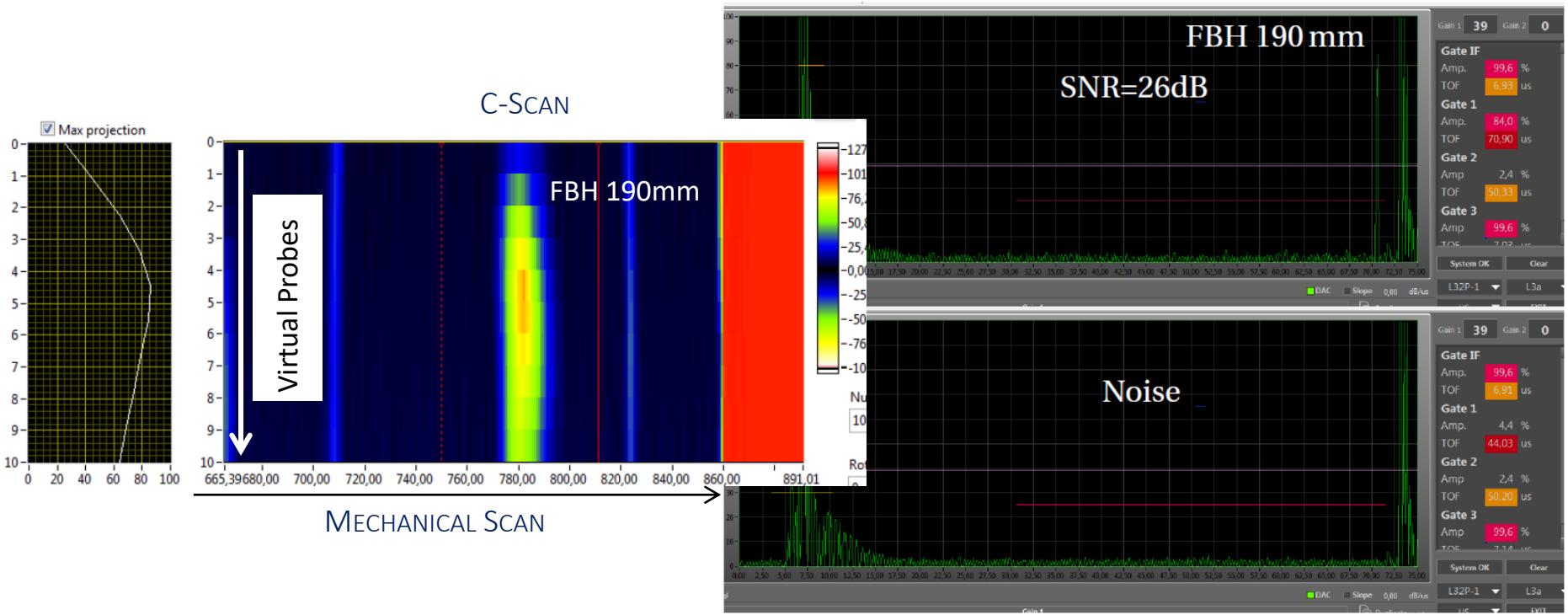


- ALUMINIUM PLATE WITH FBH Ø1.2MM

C-SCAN



Aluminium Plate – On-site results

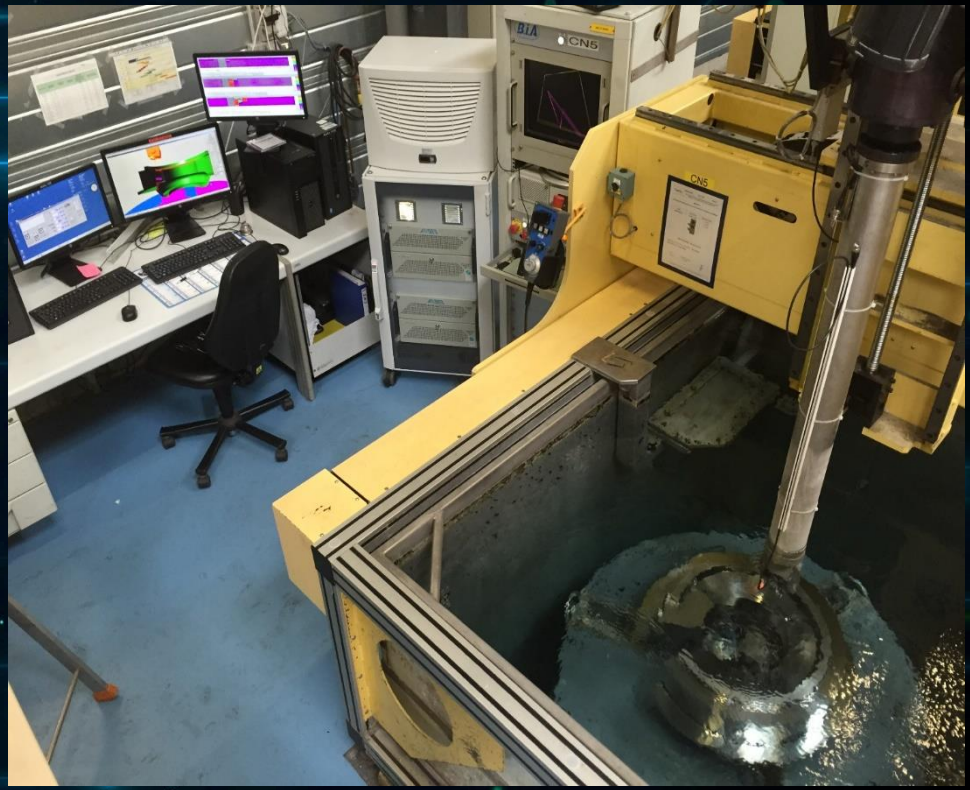


INDUSTRIAL REFERENCES USING FAAST-PA

http://cutewallpaper.org

Aircraft turbine discs using Multi-zone process

- Use of multi-focus and multi frequency with only one 128 elements 2D matrix PA probe 10MHz
- High speed rotating inspection
- Specification:
  - Titanium
  - 0,4mm FBH
  - From 2,5mm to 140mm
  - Inspection of 7 zones in 2 shots



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OCTG seamless tubes overview

- Use of Multi-angle, Multi-frequency and Multi-beam acquisition mode using 1D & 2D Matrix PA probe
  - 1D: Lamination and Wall thickness
  - 2D: Flaw detection
- Specification:
  - Transverse, Longitudinal, all oblique flaws inner and outer
  - Real time to inspect 100%
  - 1,5m/s rotating tube
  - 58mm pitch

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Rail inspection at high speed

- Use of Multi-angle acquisiton mode using 1D Linear probe and conventional
- 1 probe, up to 16 directions in one single shot and processing signals in real time
- Specification:
  - 72 km/h
  - Inspection pitch: 4mm
  - 1 Linear probe for 8 directions,
  - 1 conventional for 0°, 55° and 70° offset

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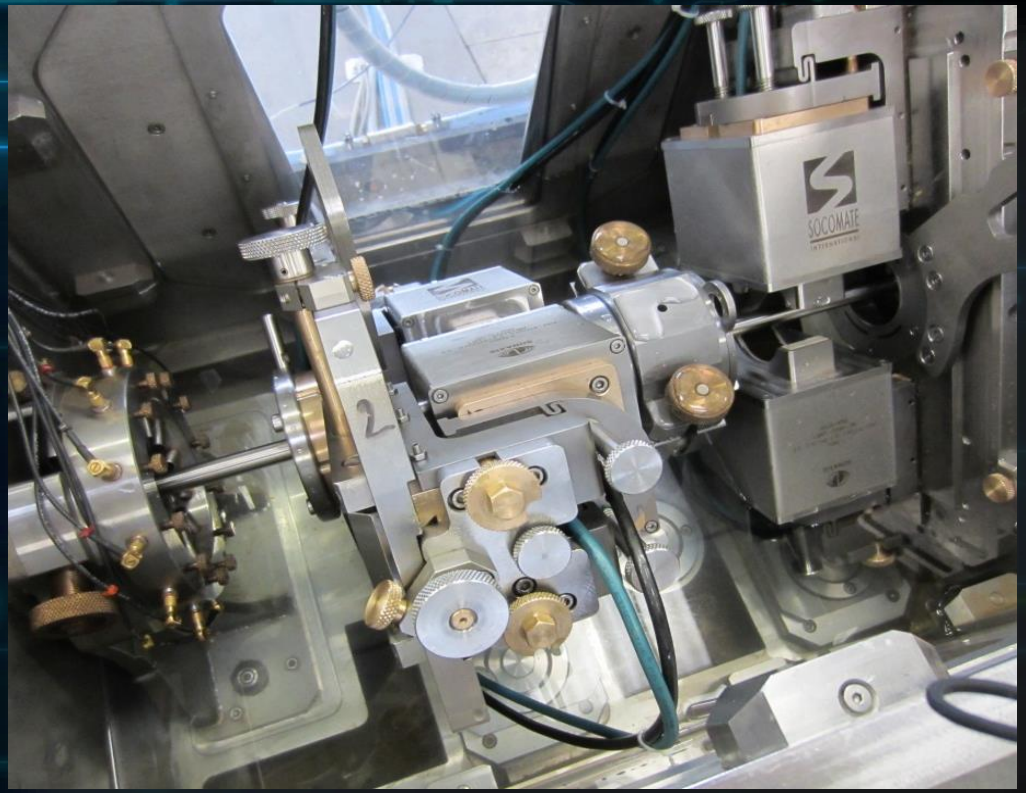
High precision tube

- Use of Multi-angle acquisition mode using Bi-linear Phased Array ring probe
- 1 probe for Transverse, Longitudinal, inner and outer flaw detection
- Specification:
  - Minimum flaw depth of 5% of Wall thickness
  - Range from 15 to 50mm
  - Thickness range from 1 to 4mm
  - Linear speed of 15m/min
  - 4 ring probes to fully inspect the tube



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Thank you for your attention & participation

Any
Questions ?