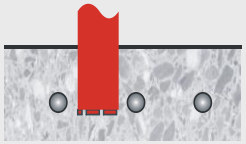
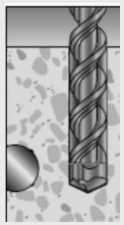
Hilti PS 1000

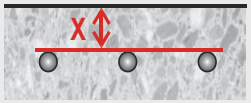
Detection task segmentation

Hit prevention





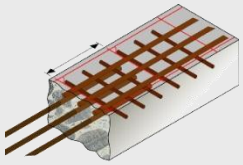
Safe drilling / coring / sawing



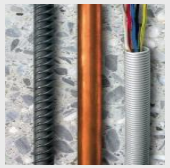
Anchor setting

Safe drilling in all base material

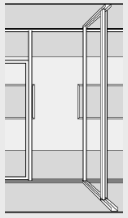
Localization



Rebar extension

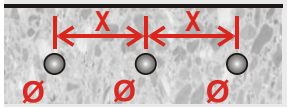


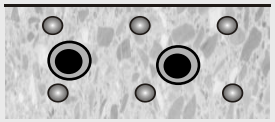
Following pipe & cable runs



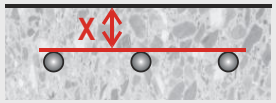
Localizing studs for fixing

Analysis

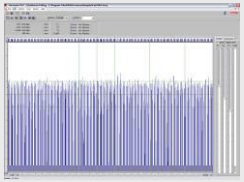


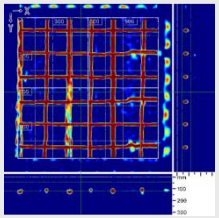


Rebar verification - layout, spacing, diameter, layer / PT-Cable, curvature, depth, density



Concrete coverage: corrosion & fire protection

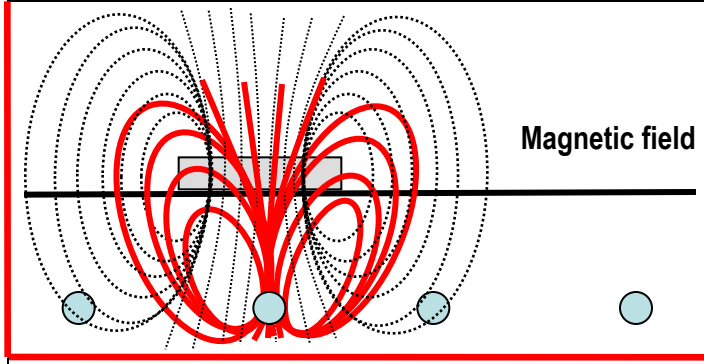




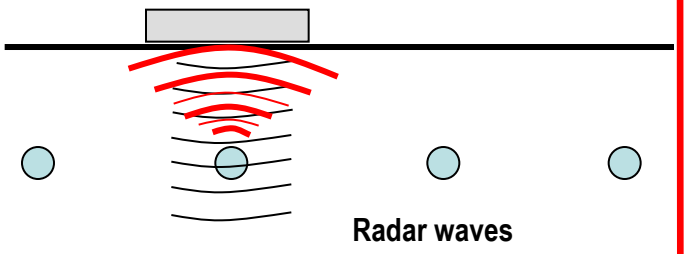
Documentation, report & archive

Detection principles for the Non Destructive Testing

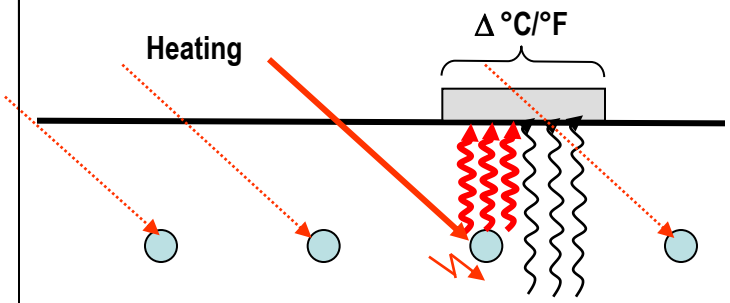
1. Magnetic Induction



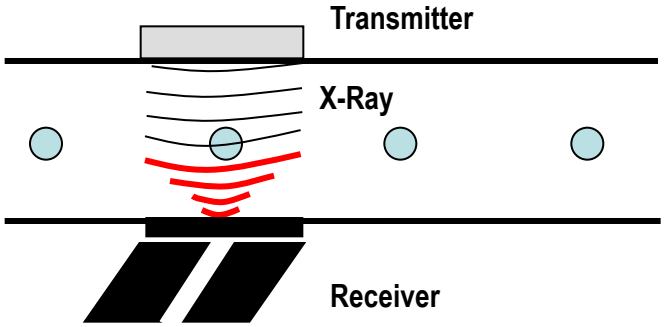
2. Reflection



3. Thermostatic



4. Radiography



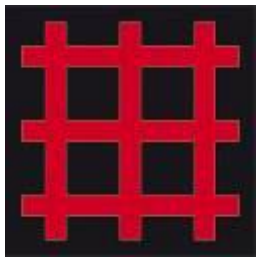
Hilti Detection Portfolio for different application solutions

PS 30 Ferrodetector

New

PS 1000 X-Scan

PS 35 Ferrodetector

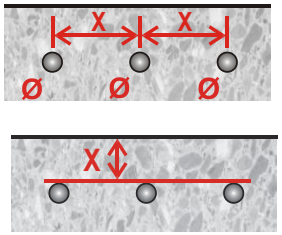
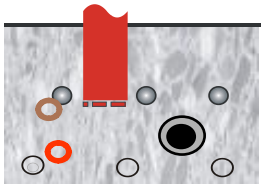
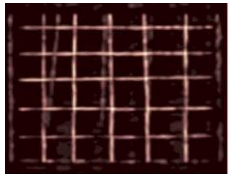


PX 10 Transpointer

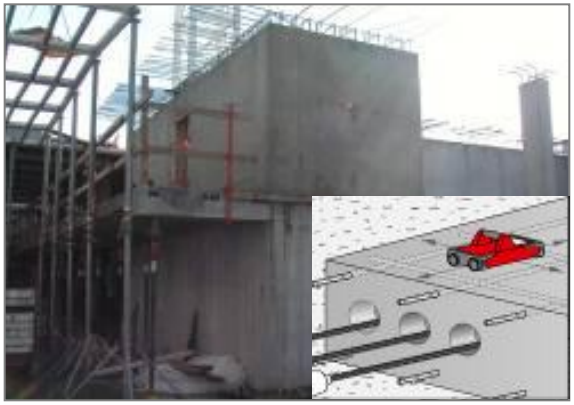
PS 38 Multidetector

PS 200 Ferroscan

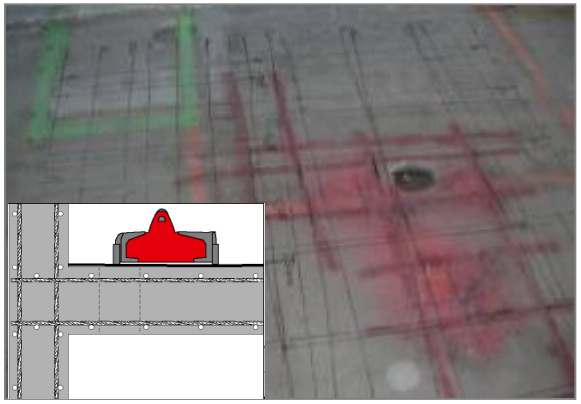
PS 200 and PS 10000 – Two complementary technologies for thorough concrete evaluation

Technology	Application	
Magnetic Indusction **PS 200 Ferroscan** 	Reinforcement analysis  	• **Rebar detection/layout** • **Concrete coverage** • **Rebar diameter** • **Measuring areas, analysis, statistics, reporting**
Pulsed Radar **PS 1000 X-Scan** 	Safe drilling & structure analysis  	• **Detection of embedded objects in different layers** • **Safe drilling** • **Measuring of slab thickness** • **Measuring areas, analysis, reporting**

Key application fields for a wide variety of customers – from specification to drilling

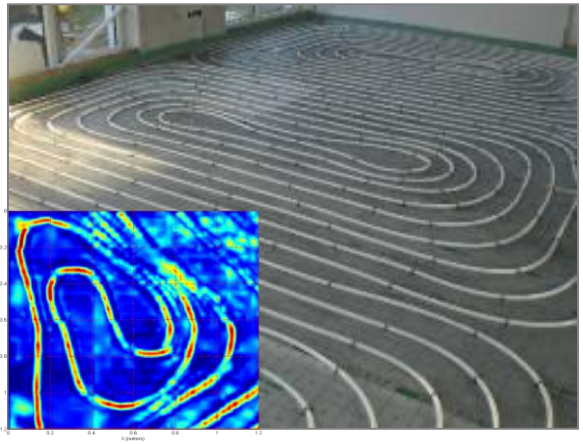


Drilling/coring / Assessing in concrete structures

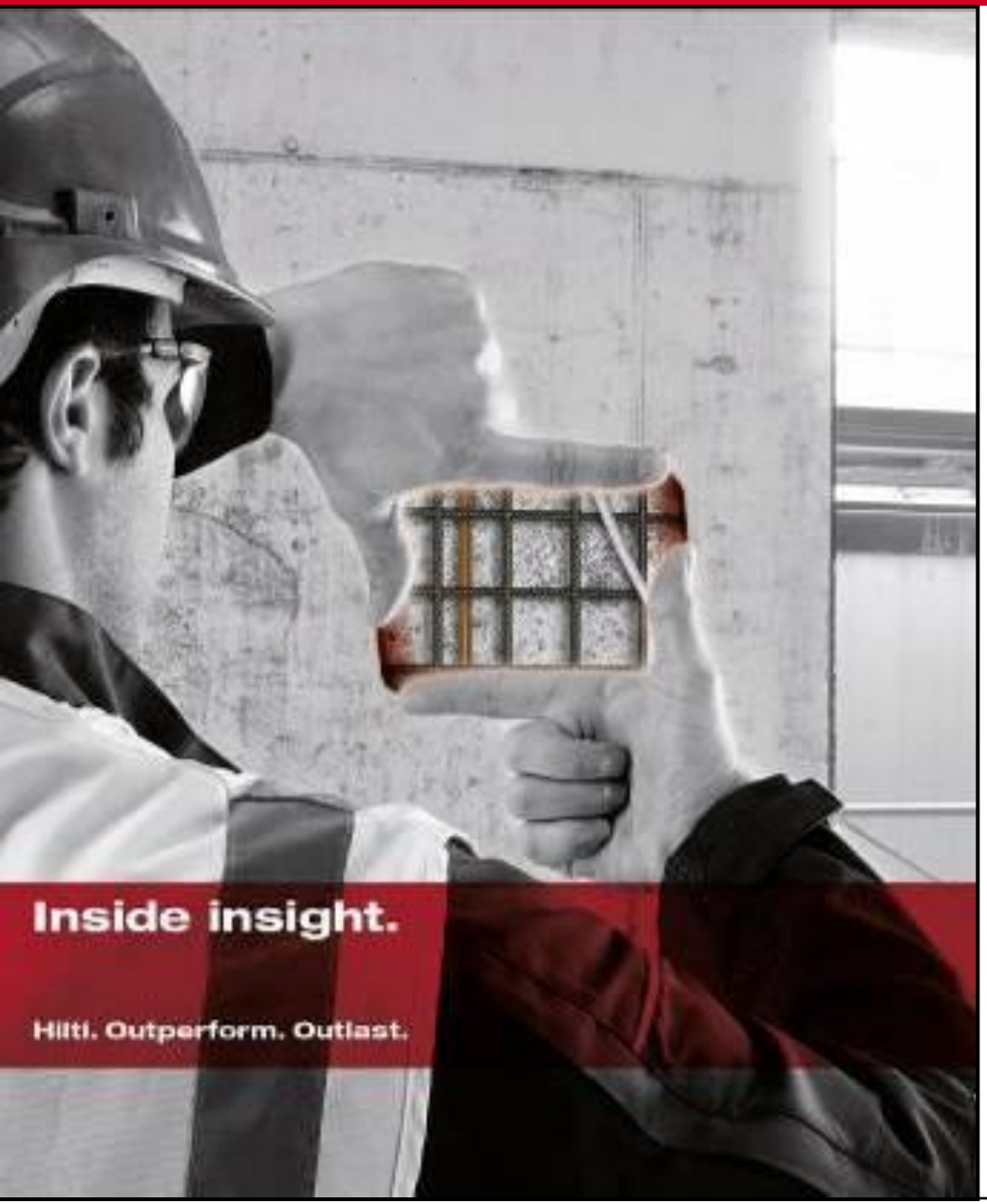


Marking layout of embedded objects in structures for drilling e.g. rebar, conduit

Non-destructive inspection of bridges e.g. location of tendons



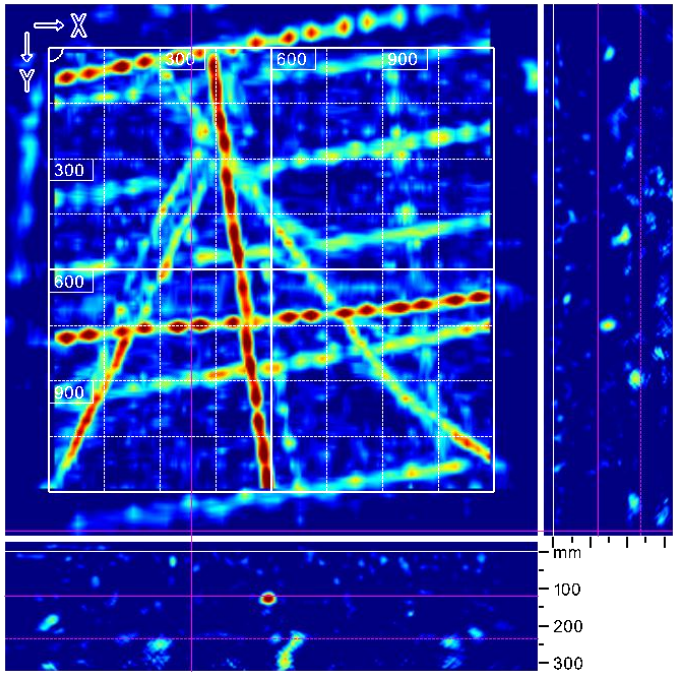
Locating objects in floor e.g. heating pipes



Example scans

Data visualization on site in 2D and 3D view: Application Post-tensioning concrete slab

Embedded objects:
- Tensioning cables
- Rebar
- Electrical conduit



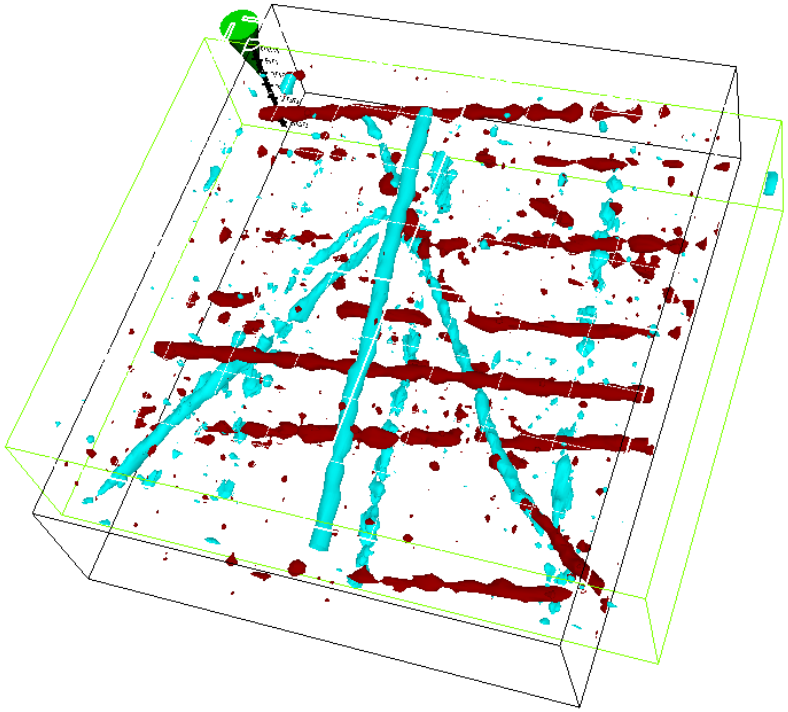
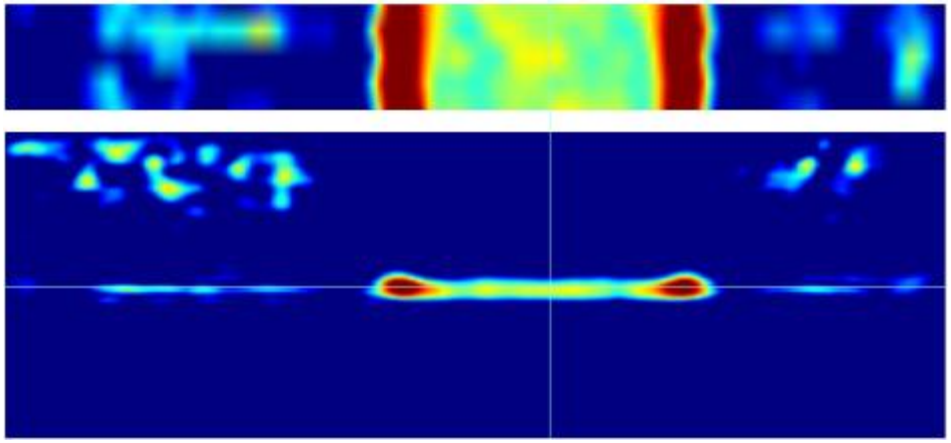
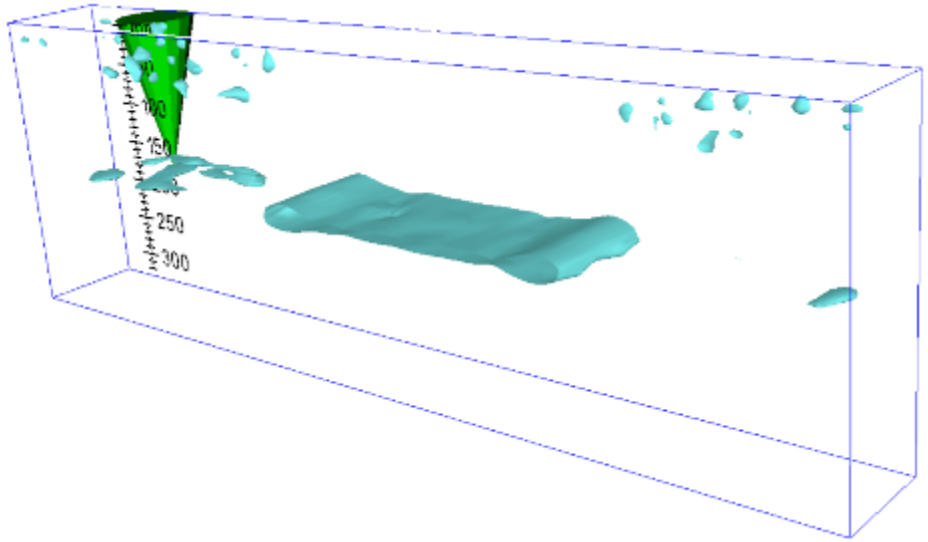


Plate performance with QS – Recording mode

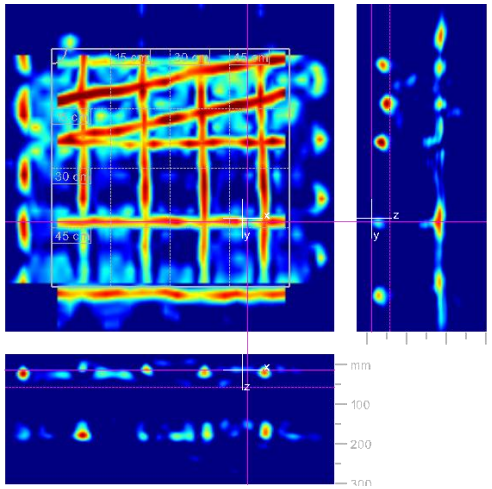


2D view of Quick Scan Recording



3D view of Quick Scan Recording

Scan Example: Audi Plant, Ingolstadt



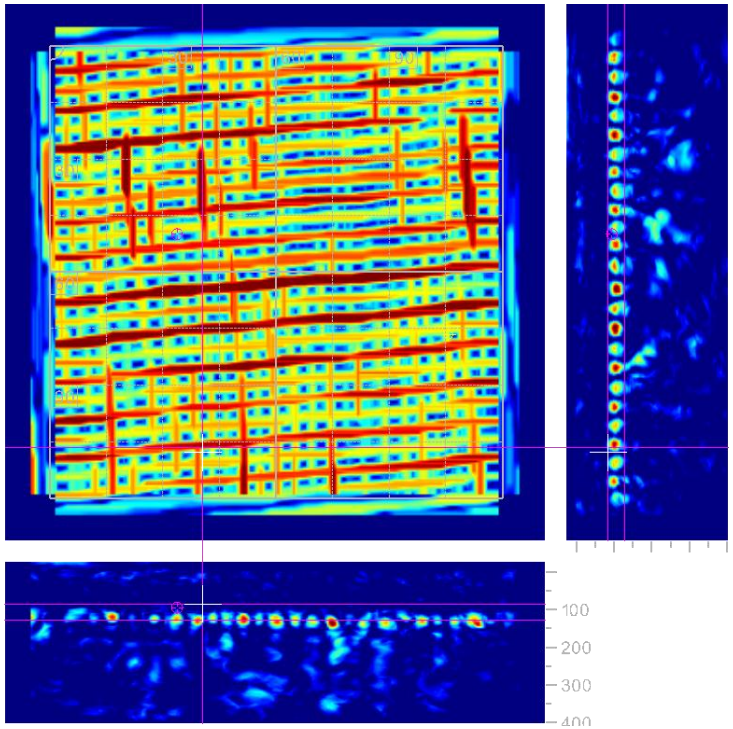
Outset situation:
Verification of anchor holes drilled – tendon in roof trusses cut?

Target:
Locating tendons in accessible places – intrapolation of tendon position

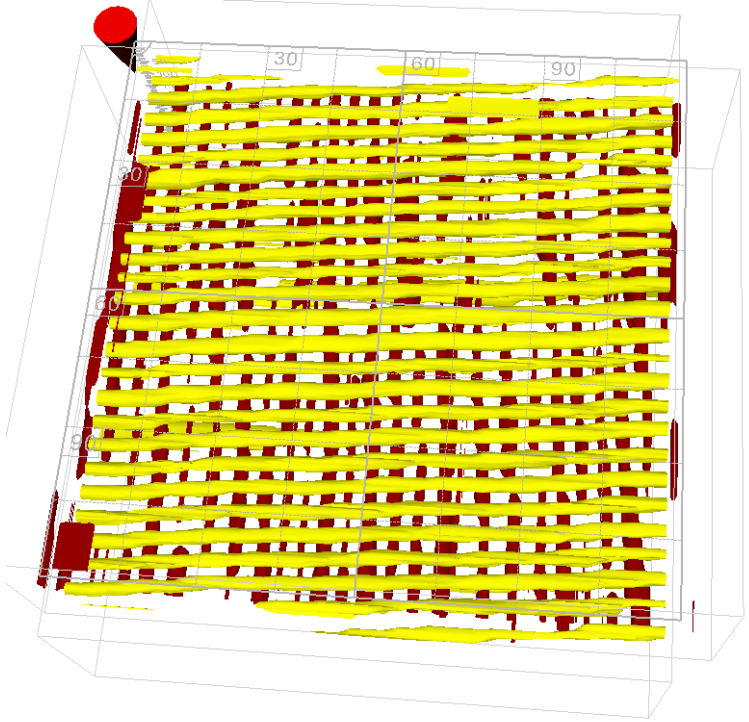
Result:
Fast (2 locations in 10min) and easy to interpret results of scanning area – tendon cable was cut

Application OL3: Nuclear Power Plan APC floor slab in Turbine Island

2D view 120x120cm Area



3D view of 120x120cm Area



Target :

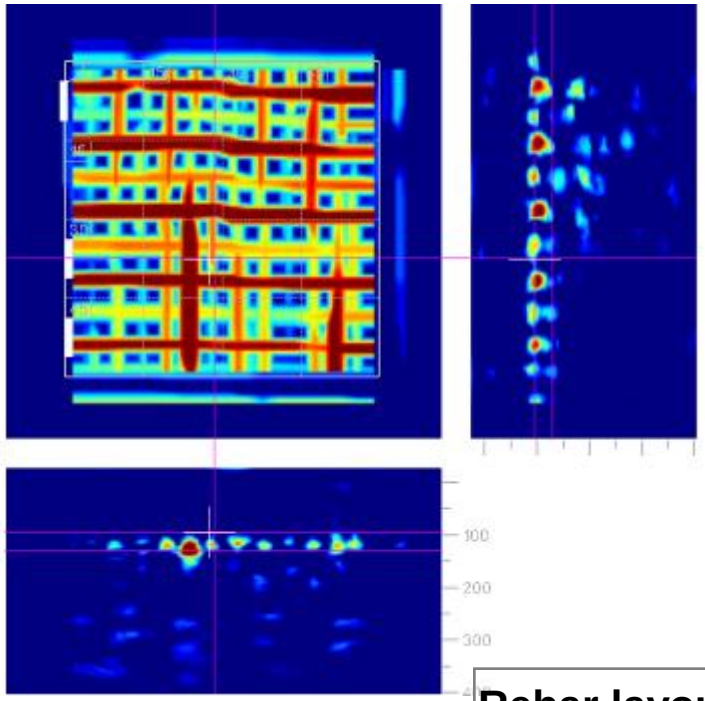
Locating rebar layout for anchor plate installation without rebar hit allowance

Rebar layout:

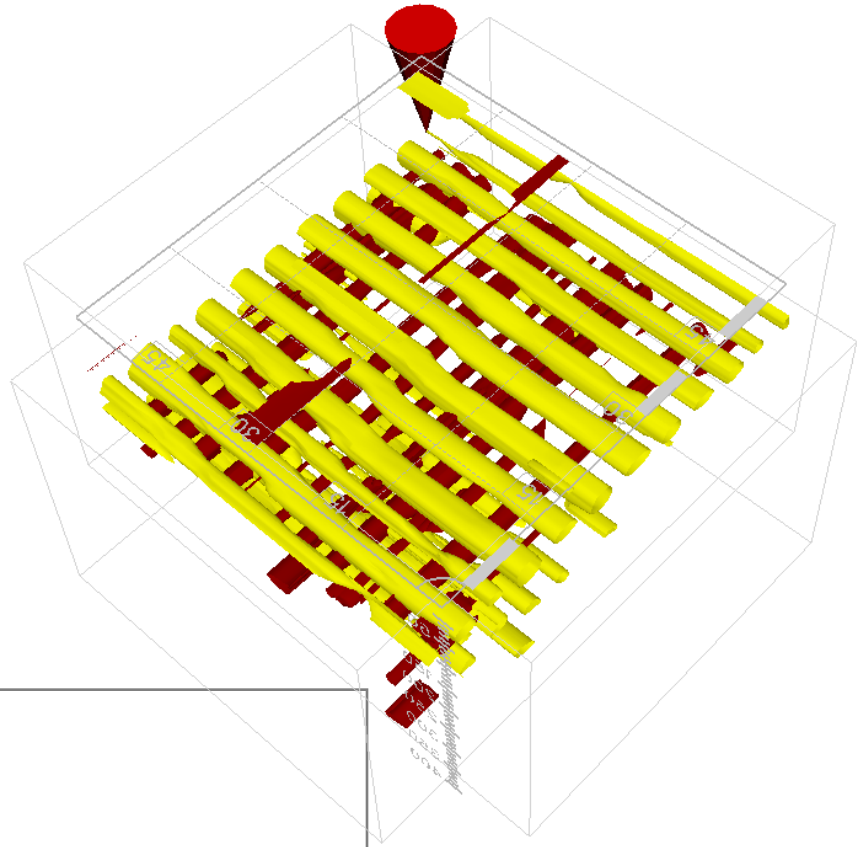
- **30 mm rebar diameter**
- **6 cm rebar spacing**
- **8 cm depth**

Application OL3 – wall with ferritic concrete in Turbine Island

2D view of 60x60cm area



3D view of 60x60cm area

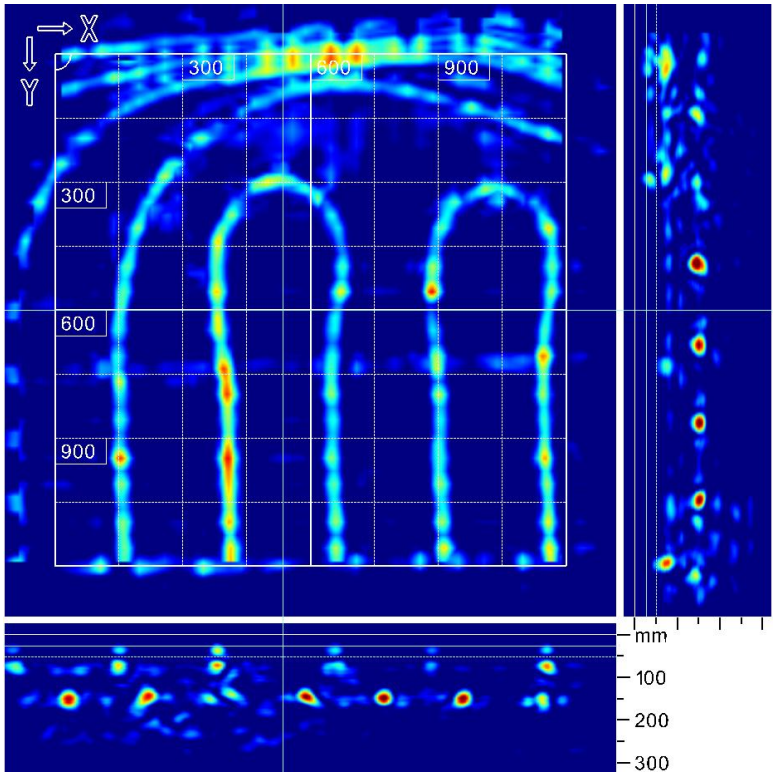


Rebar layout:

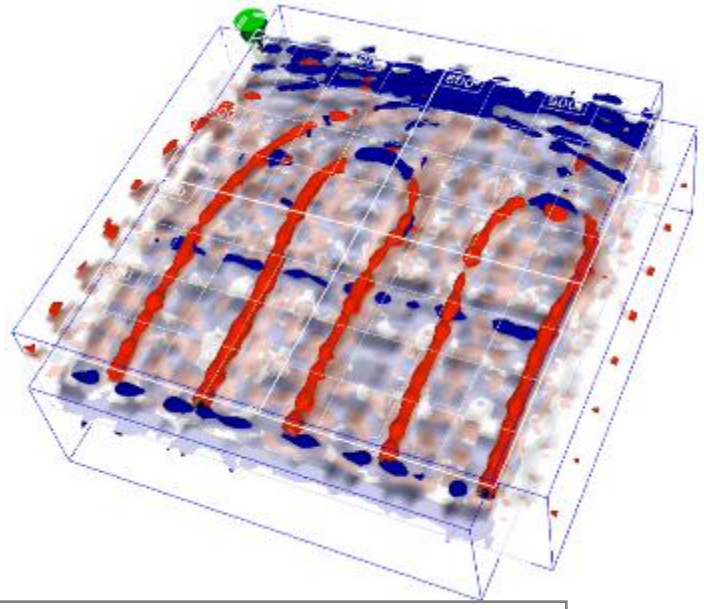
- 20 mm rebars
- 6 cm spacing
- 7,5 cm depth first layer
- 10cm 2nd layer

Application VGO Schaan- Floor heating performance

2D view of 120x120cm area



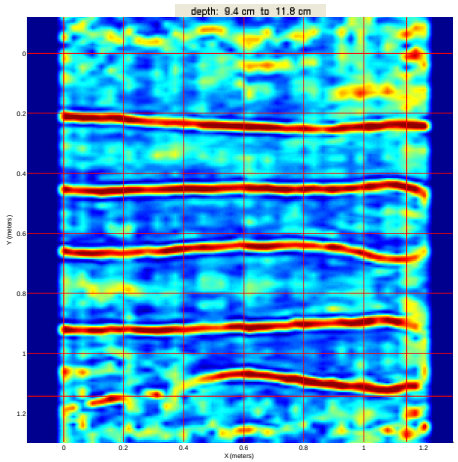
3D view of 120x120cm area

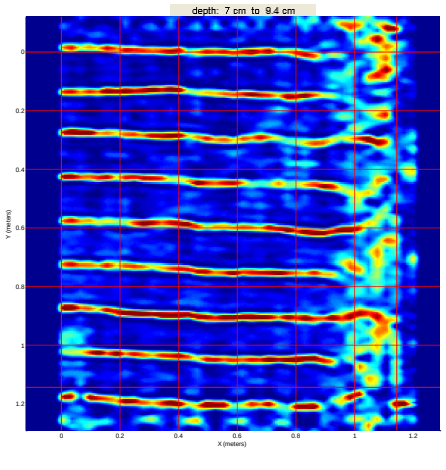


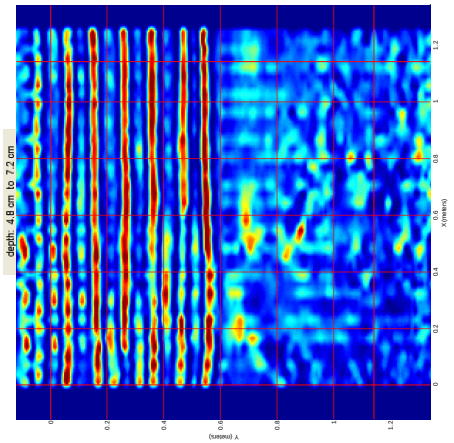
Ground layout:

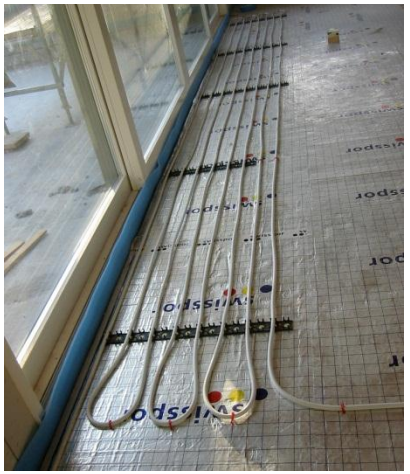
- 20 mm pipe loops on top in estrich
- 150 mm mesh in a depth of 150 mm

Application example: Floor heating





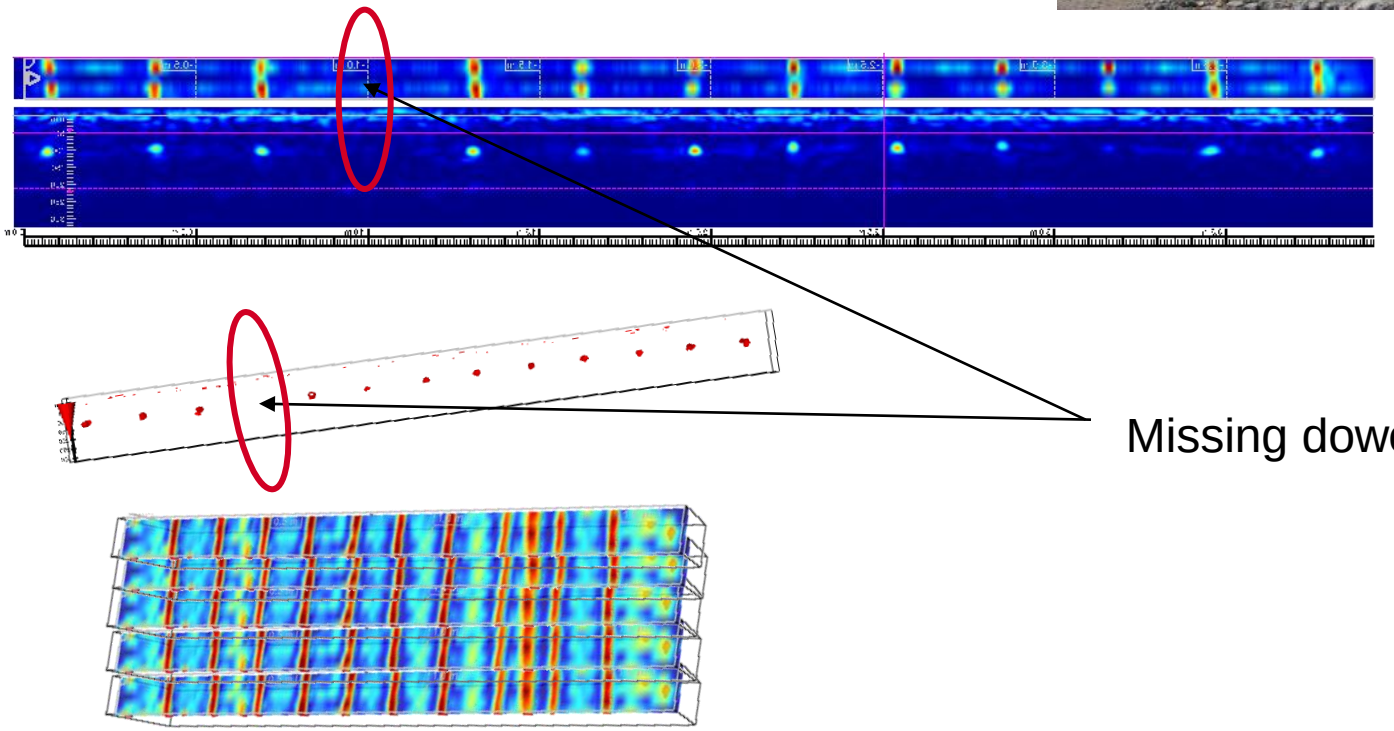




Application example: Dowel bars in road construction

Application:

- **Road: dowel bars / rebar basked detection – connection between concrete slabs**
- **Parking, Bridge decks: large areas in QSR**

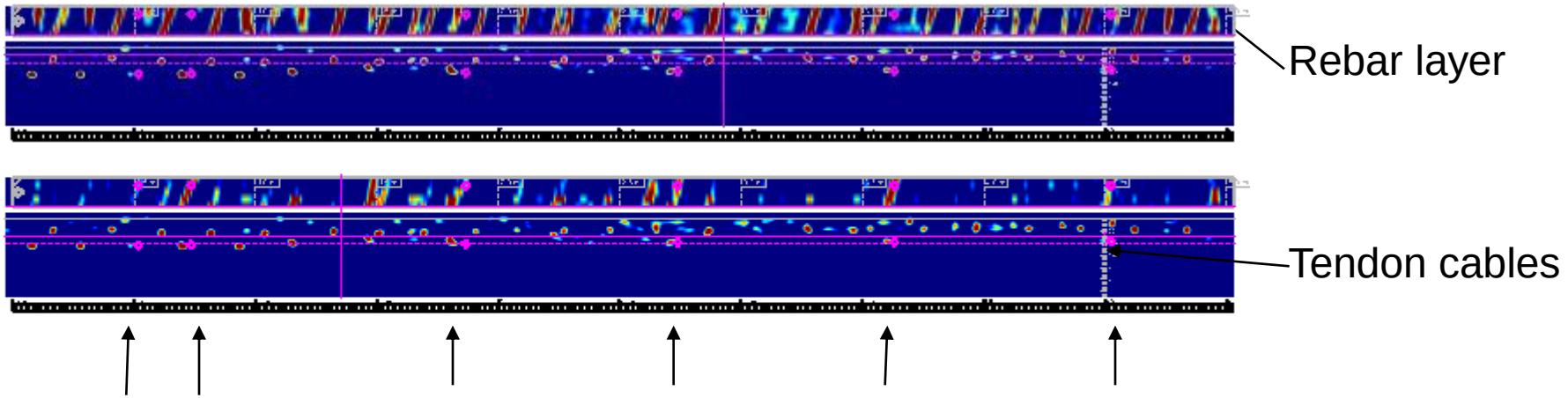


Missing dowel bar

Application example: Tendon cables in Bridge decks

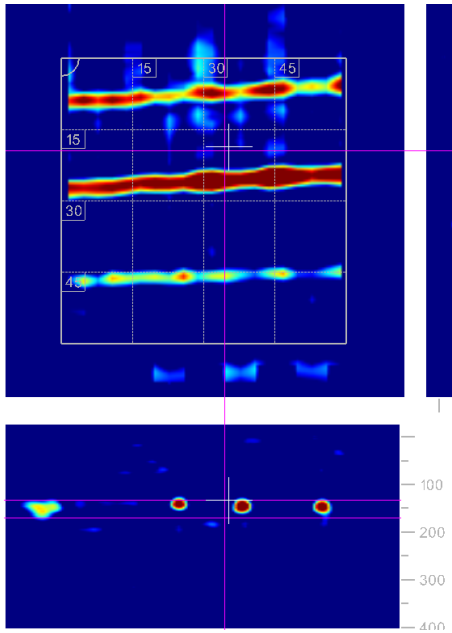
Application:

- **Bridge deck: detection of transfers and longitudinal tendons as well as rebar layout**
- **Verification of position, quality control or existence according to plans**

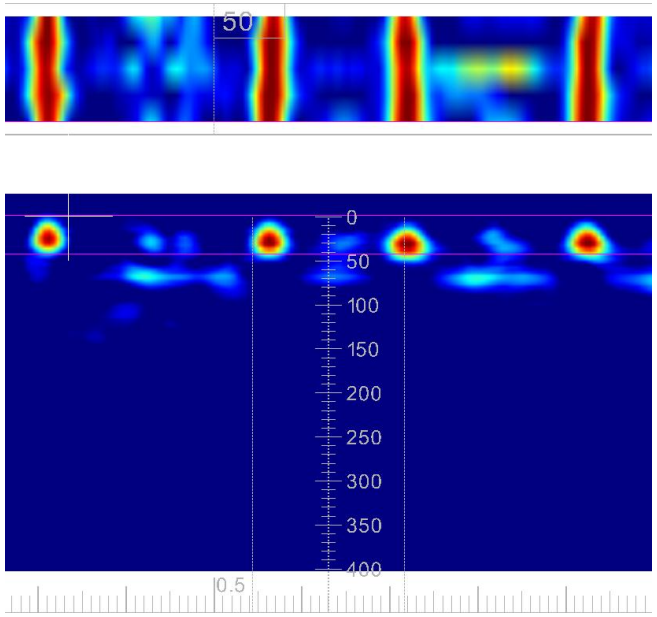


NPP Krümmel – floor slab

2D view of 60x60cm area



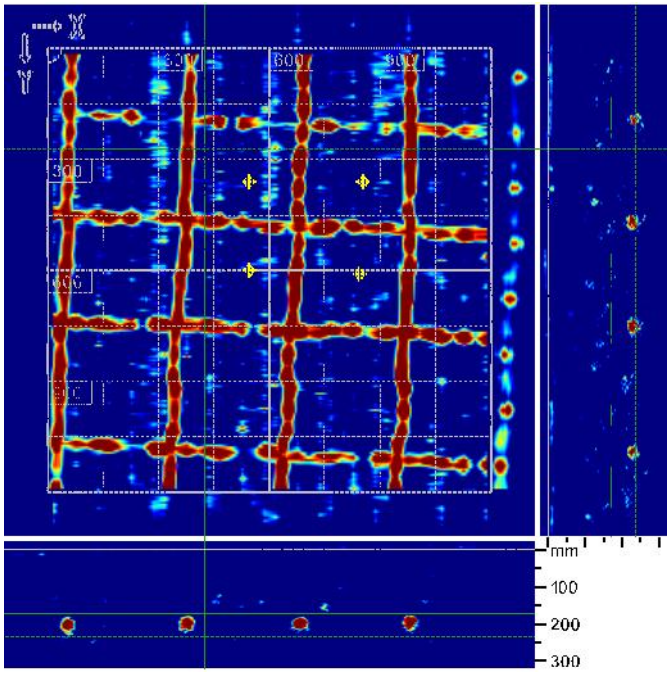
2D view Quickscan

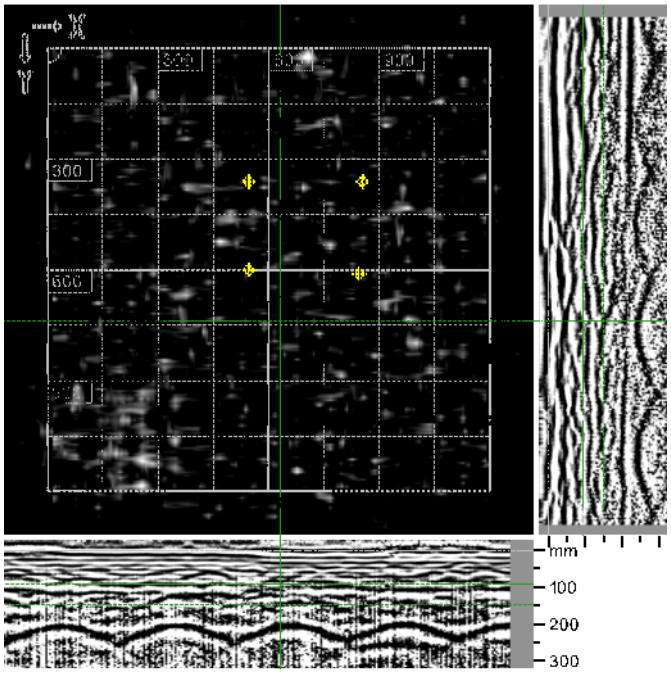


Rebar layout:
- Rebar spacing 15 cm
- 12 cm screed on top of concrete with epoxy coating
- Depth 15 cm

Rebar layout:
- Rebar spacing ~15 cm
- 1 cm depth, concrete with epoxy coating

Application Hunterston: scanning through screed / measuring layer thickness



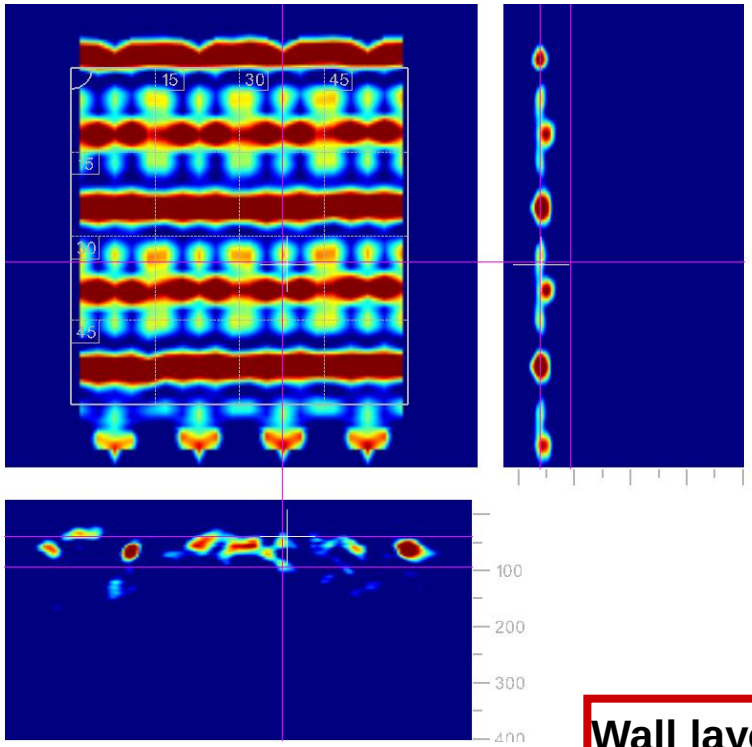


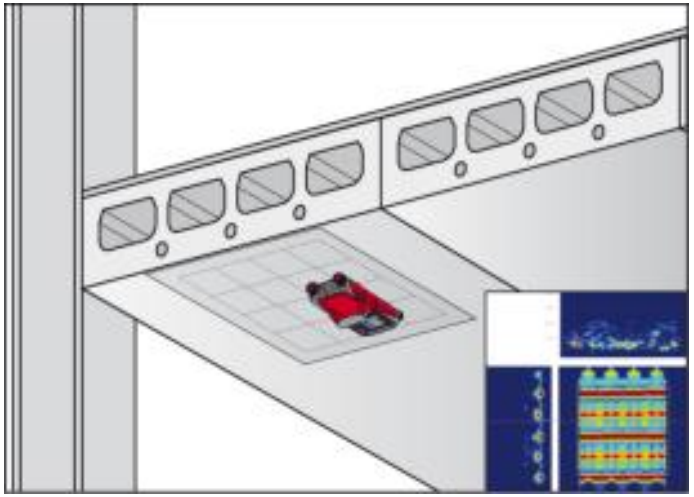
Rebar layout:

- 10 cm screed on top of concrete with coating
- Rebar spacing 30 cm
- Rebar Depth 22 cm

Application OL3 – Pre-stressed Hollow wall

2D view of 60x60cm area

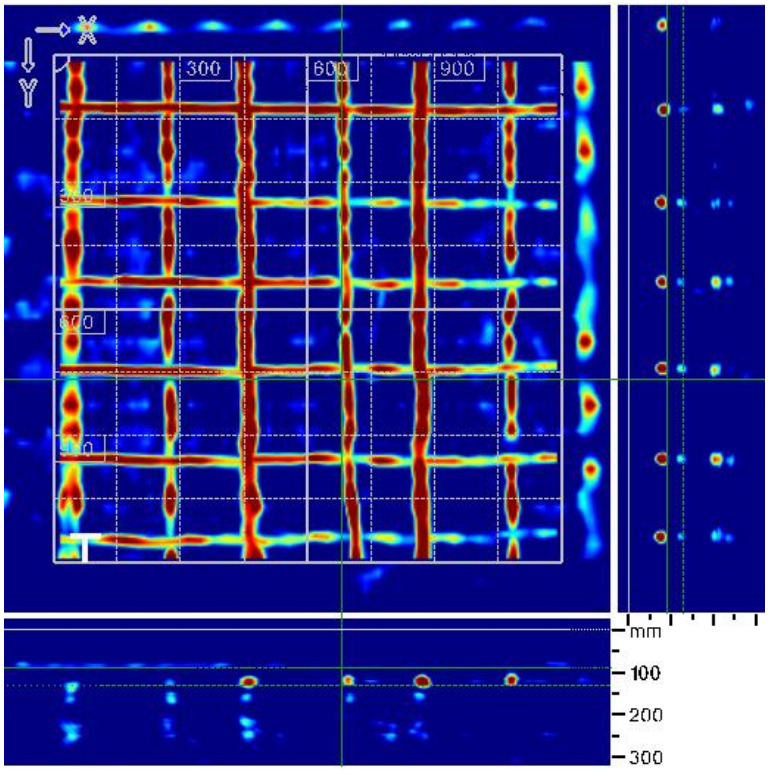


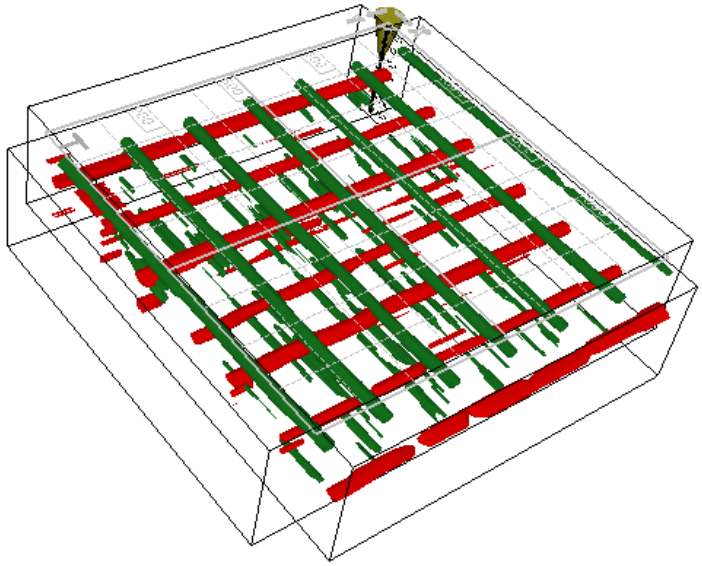


Wall layout:

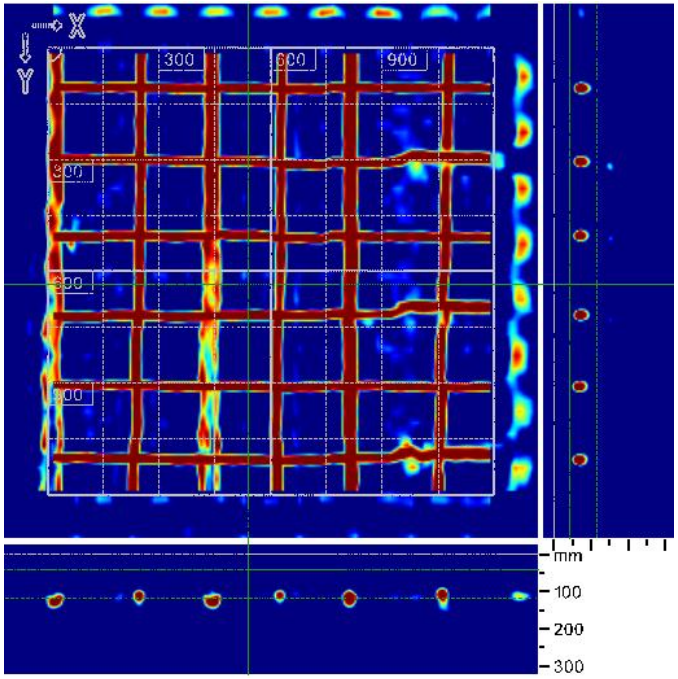
- 3 tendon cables
- 2 cavities
- 30 mm depth for tendons
- 45 mm depth for cavities

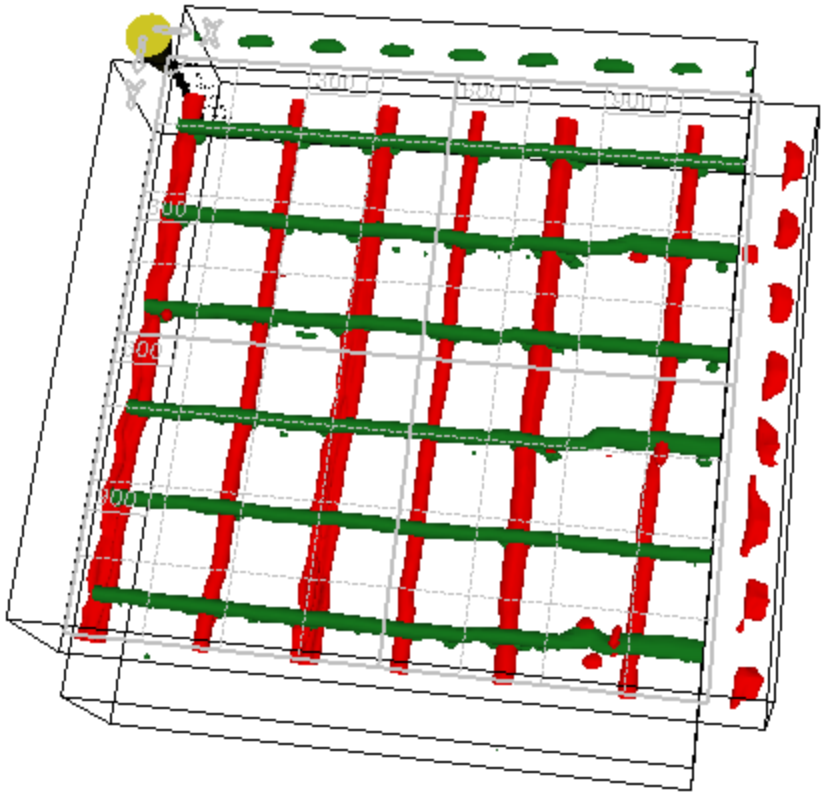
Application Sellafield: Multilayer Rebar - wall



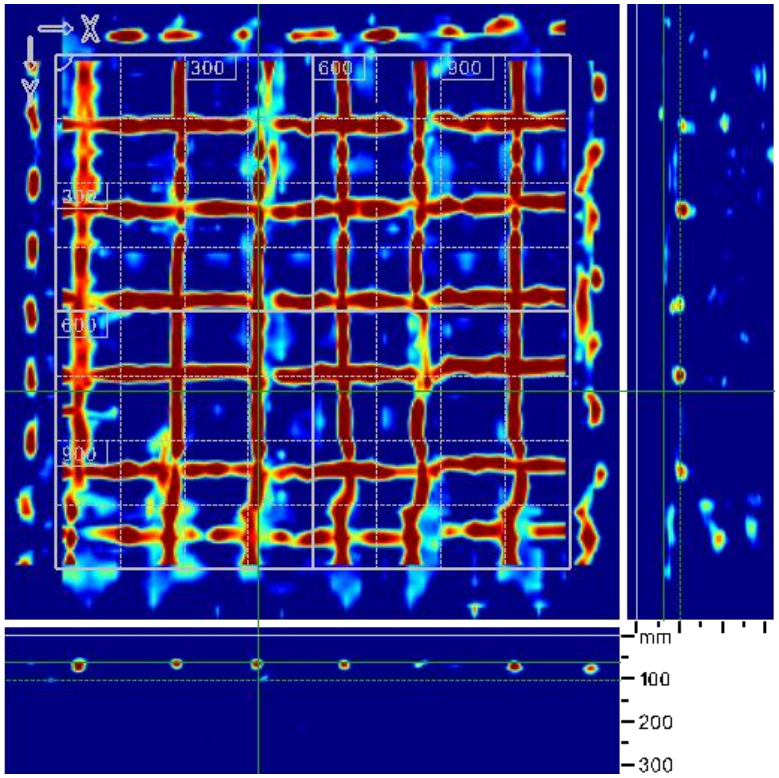


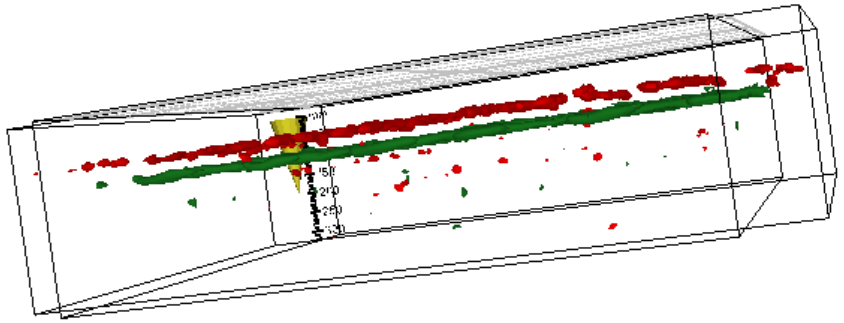
Application Sellafield: Wall



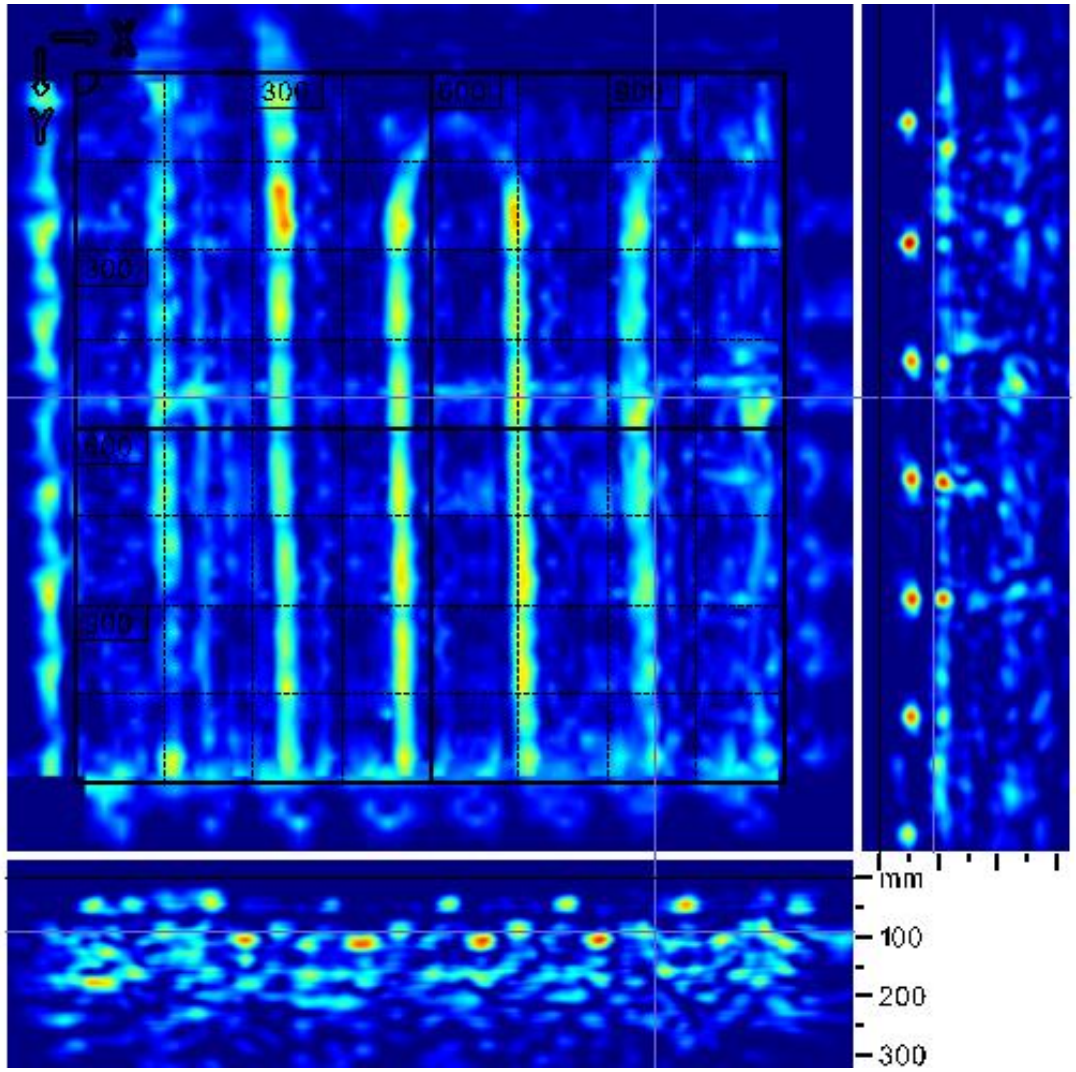


Application Sellafield: floor





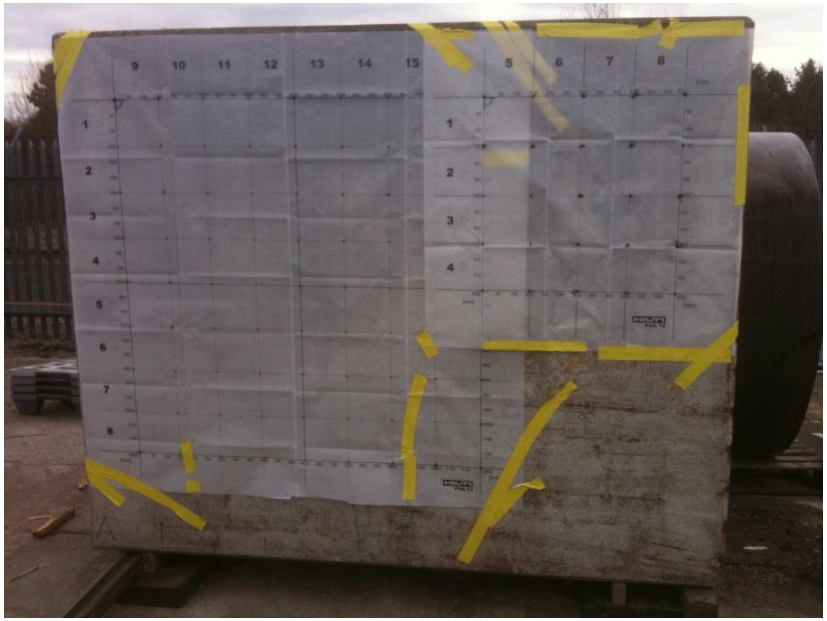
Liverpool – Under floor Heating



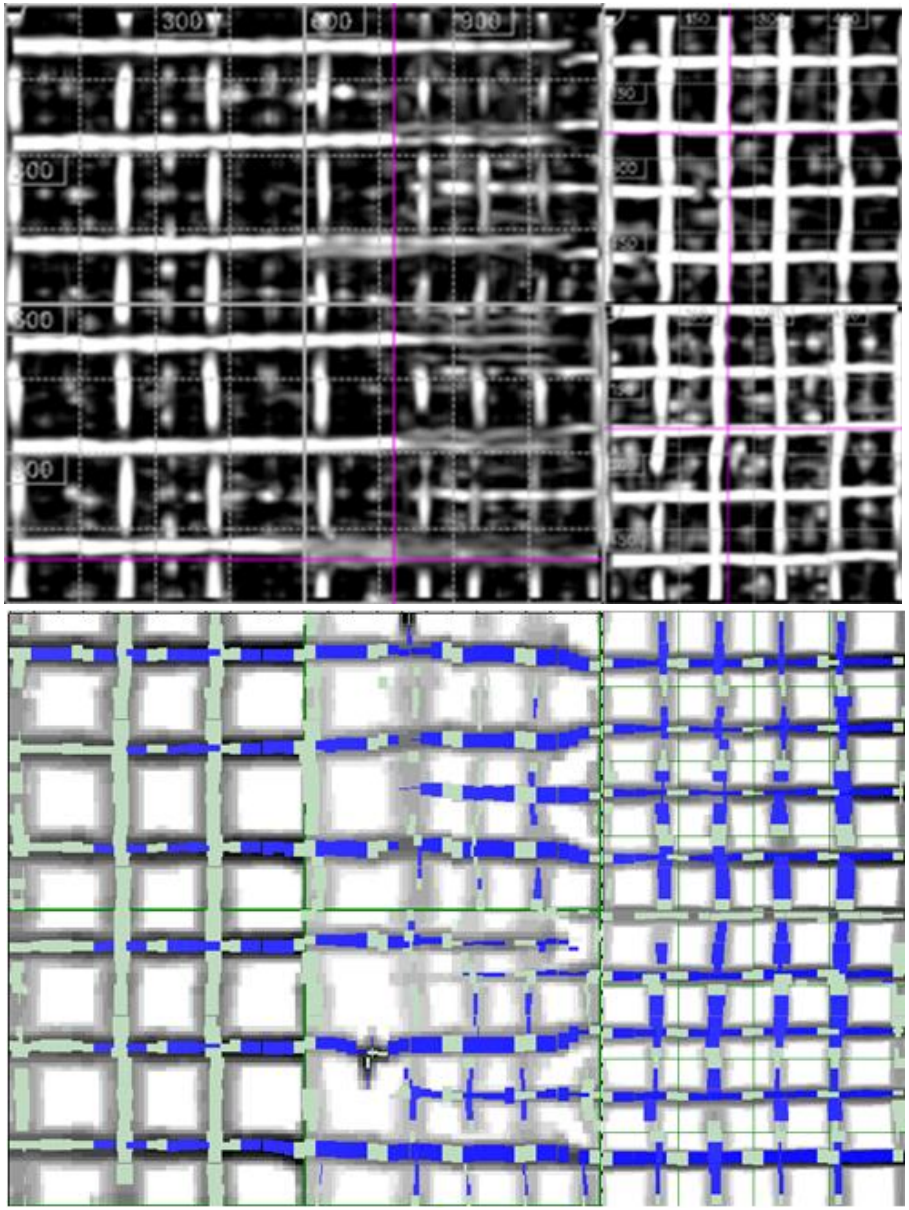
Face A

1

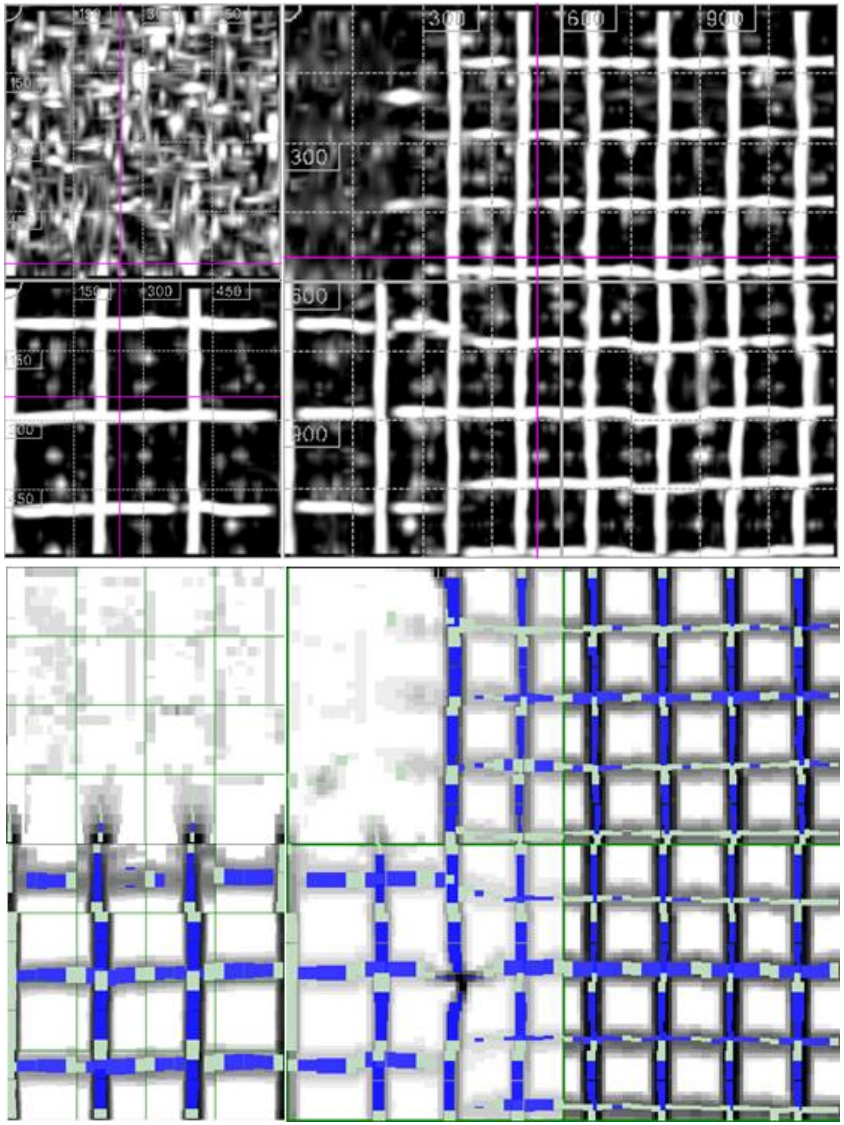
2



3



Comparison of PS1000 & PS200 Scans – Face A



Comparison of PS1000 & PS200 Scans – Face B

Concrete Test Piece

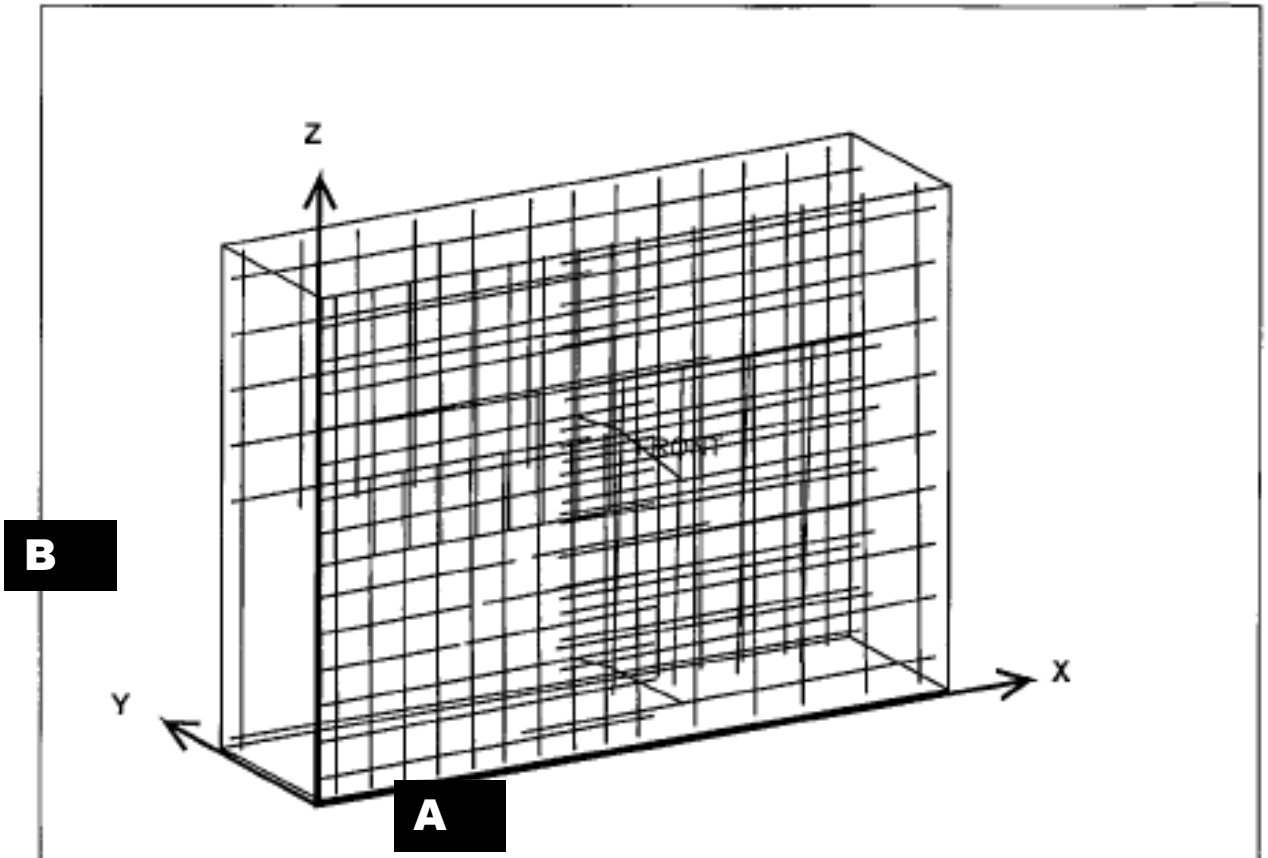
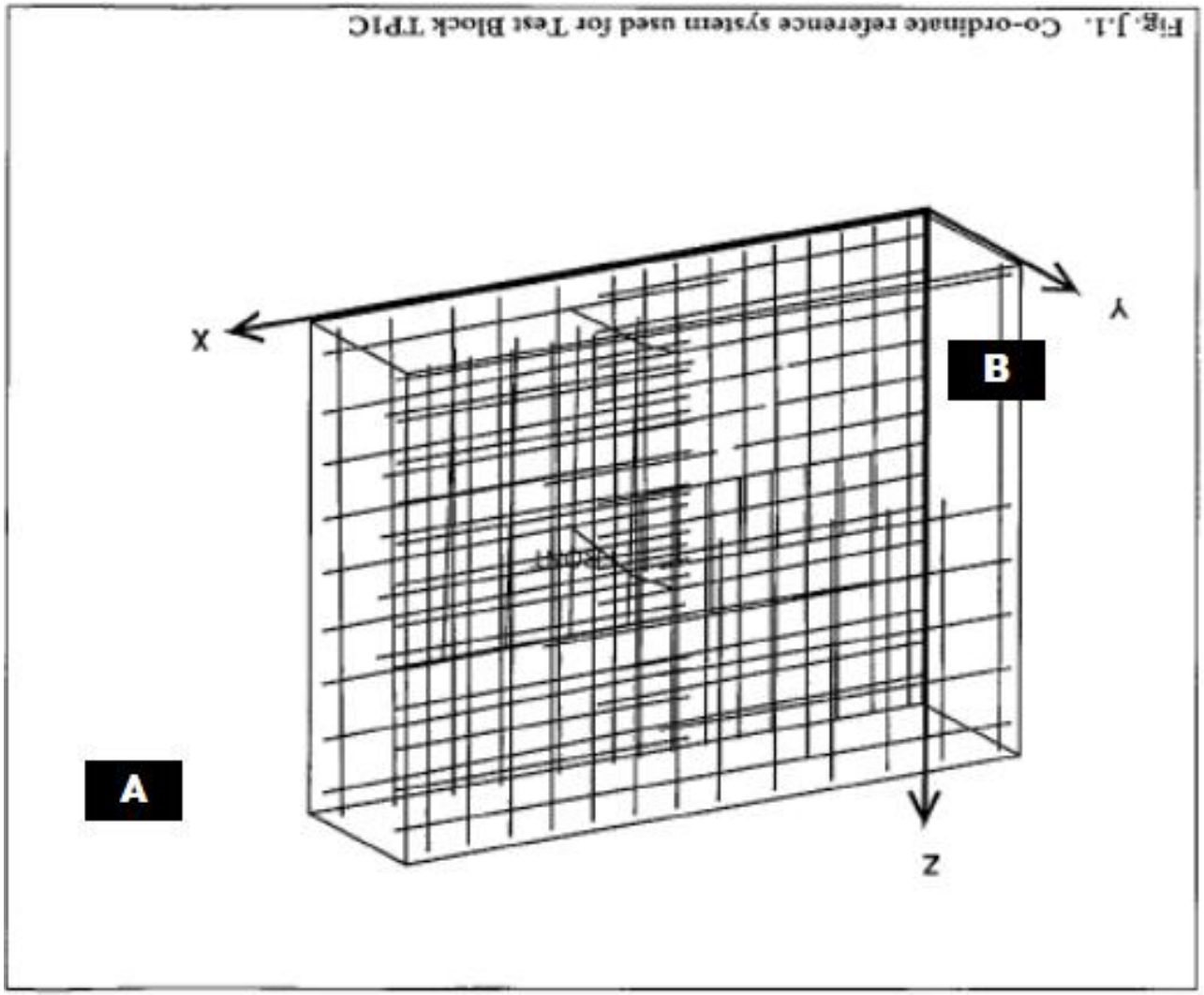
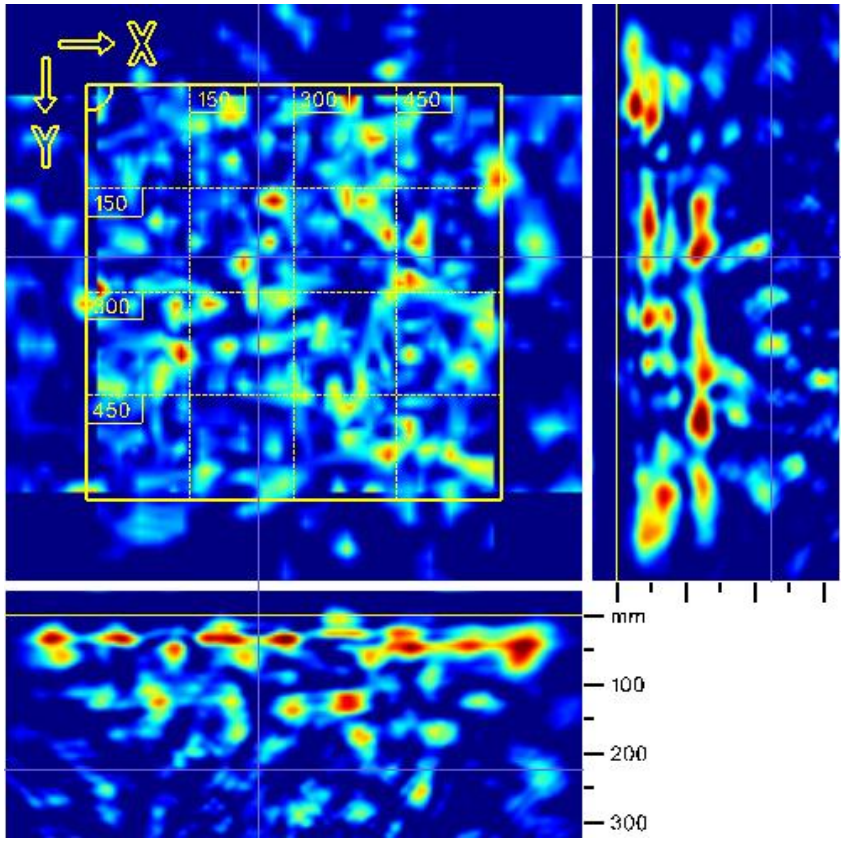


Fig. J.1. Co-ordinate reference system used for Test Block TP1C

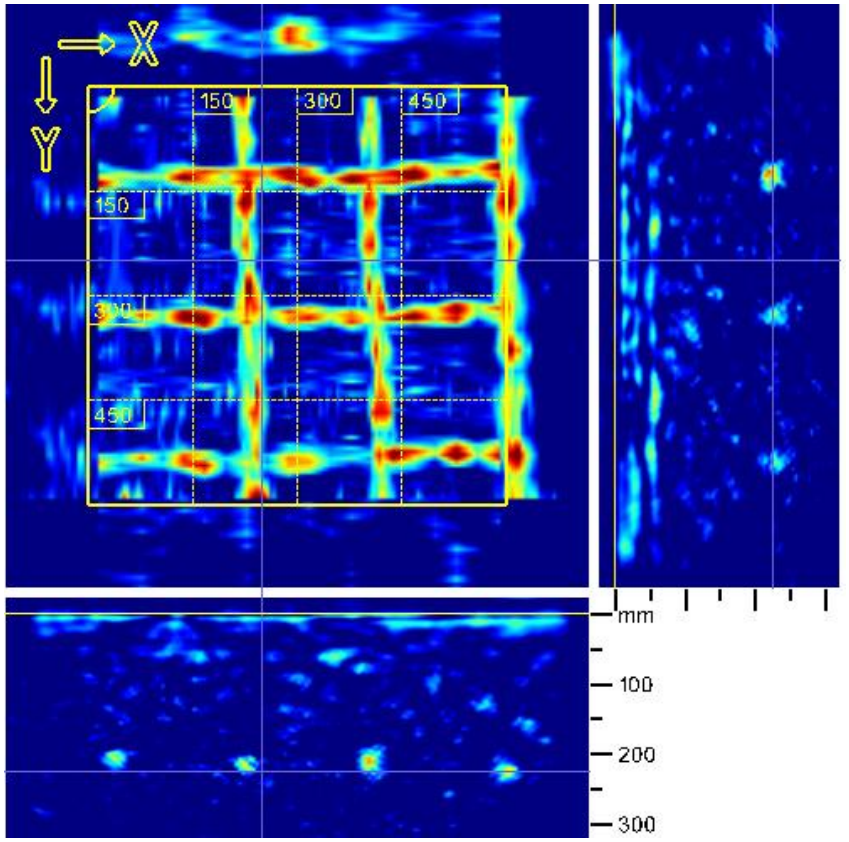


Note: Orientation of the test block at site was shown by the scan results to be “upside down” & rotated 180deg – Highlighted in results by area of “missing” rebar!!

Swimming Pool – Importance of Concrete Settings…



Concrete setting: 3.0

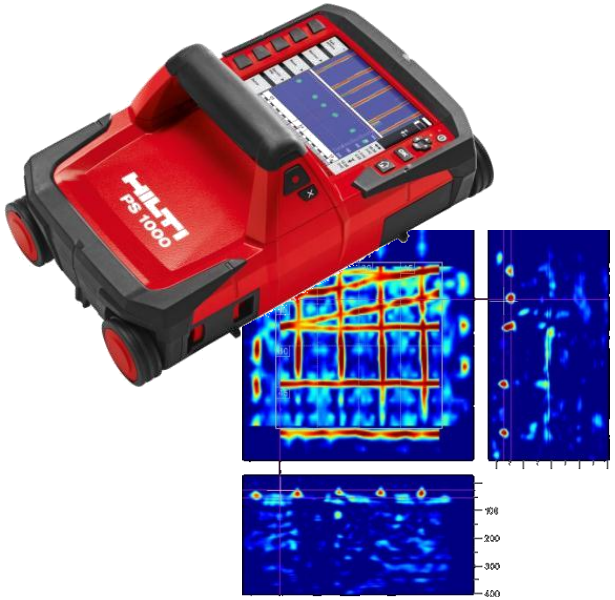


Concrete setting: 12.0

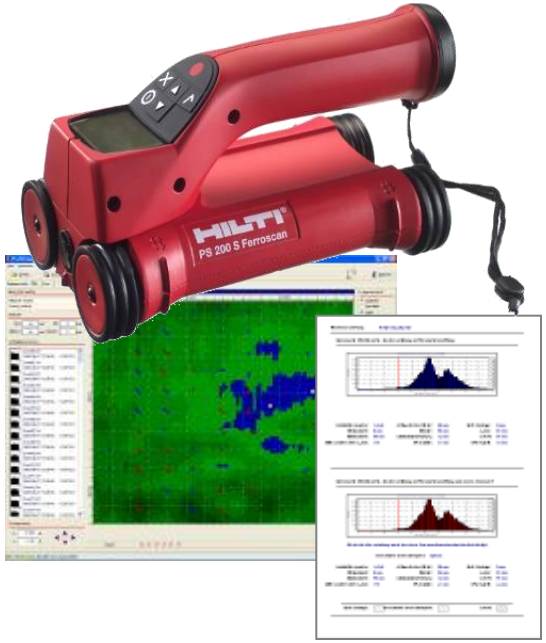
Same data… Same depth (225mm) … Different concrete setting

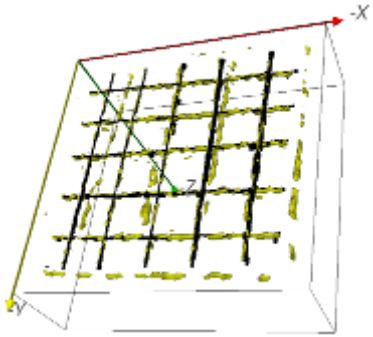
Two complementary detection solutions

Radar for object visualisation in multiple layers



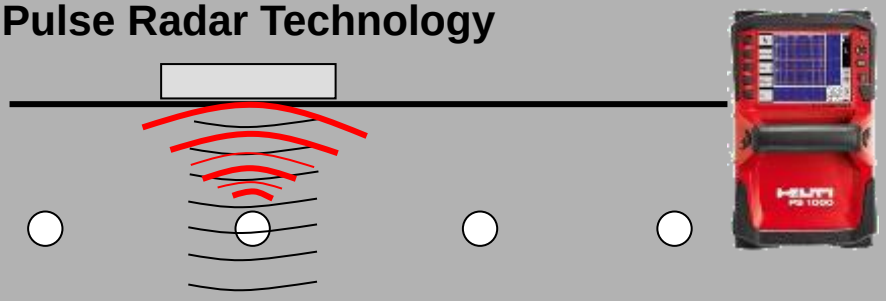
Induction for reinforcement analysis





High differentiation versus PS 200 Ferroscan allows clear product positioning

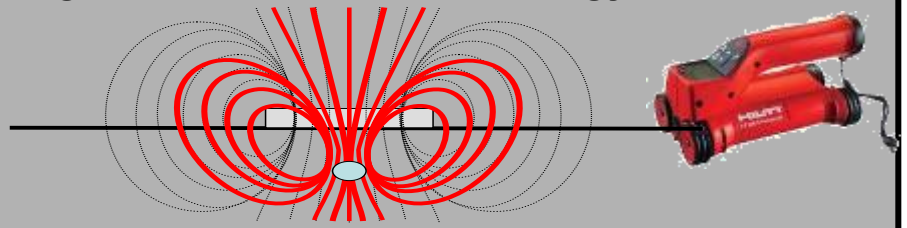
Pulse Radar Technology



- High detection depth (up to 30 cm in dry concrete)
- Multiple layer detection possible
- Imaging of plastic pipes and non-metallic objects possible
- Detection of large diameter objects possible
- Indication of object depth

➢ **Ideal for drilling tasks**

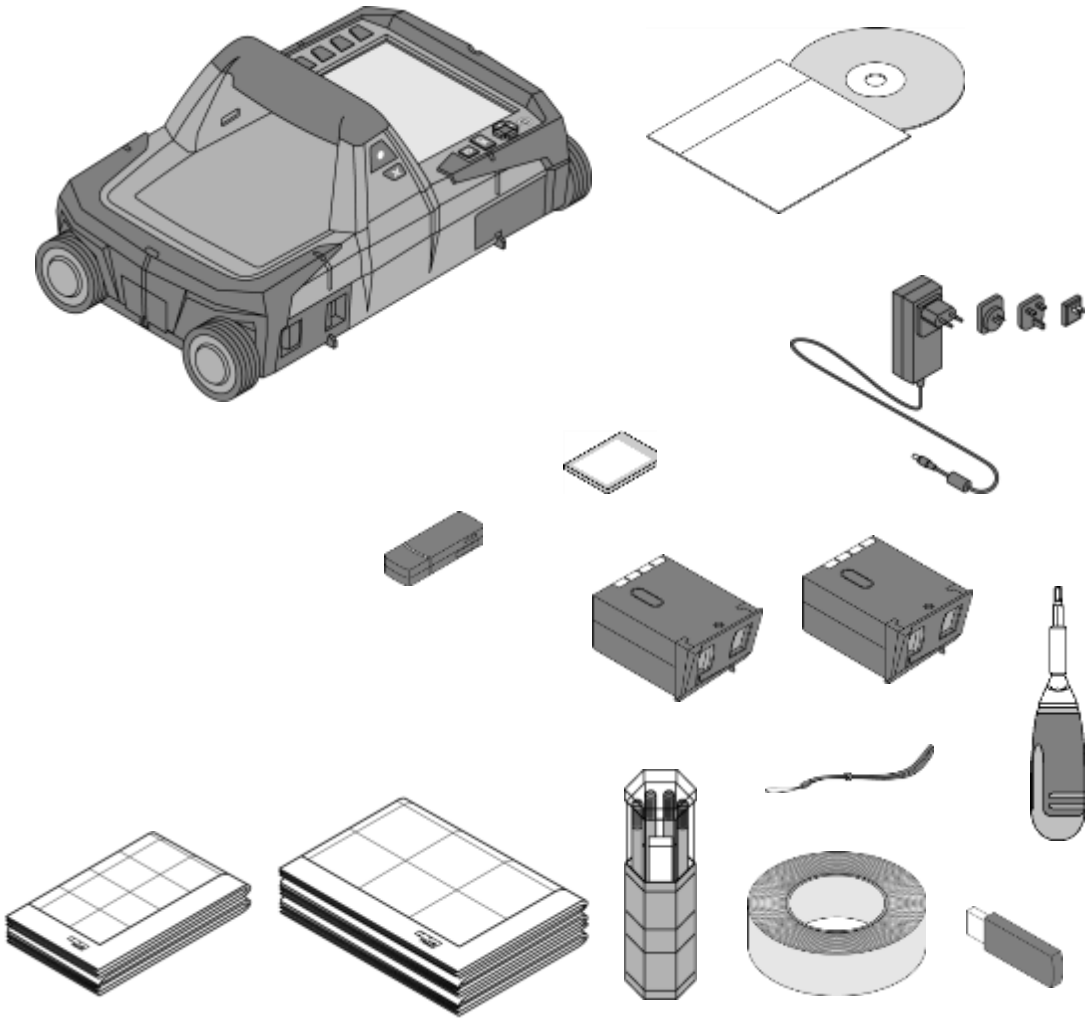
Magnetic induction Technology



- Exact depth determination (cover meter function)
- Diameter estimation possible
- Rebar layout, spacing up to 16cm depth – up to first layer

➢ **Ideal for quality assessment of concrete structures**

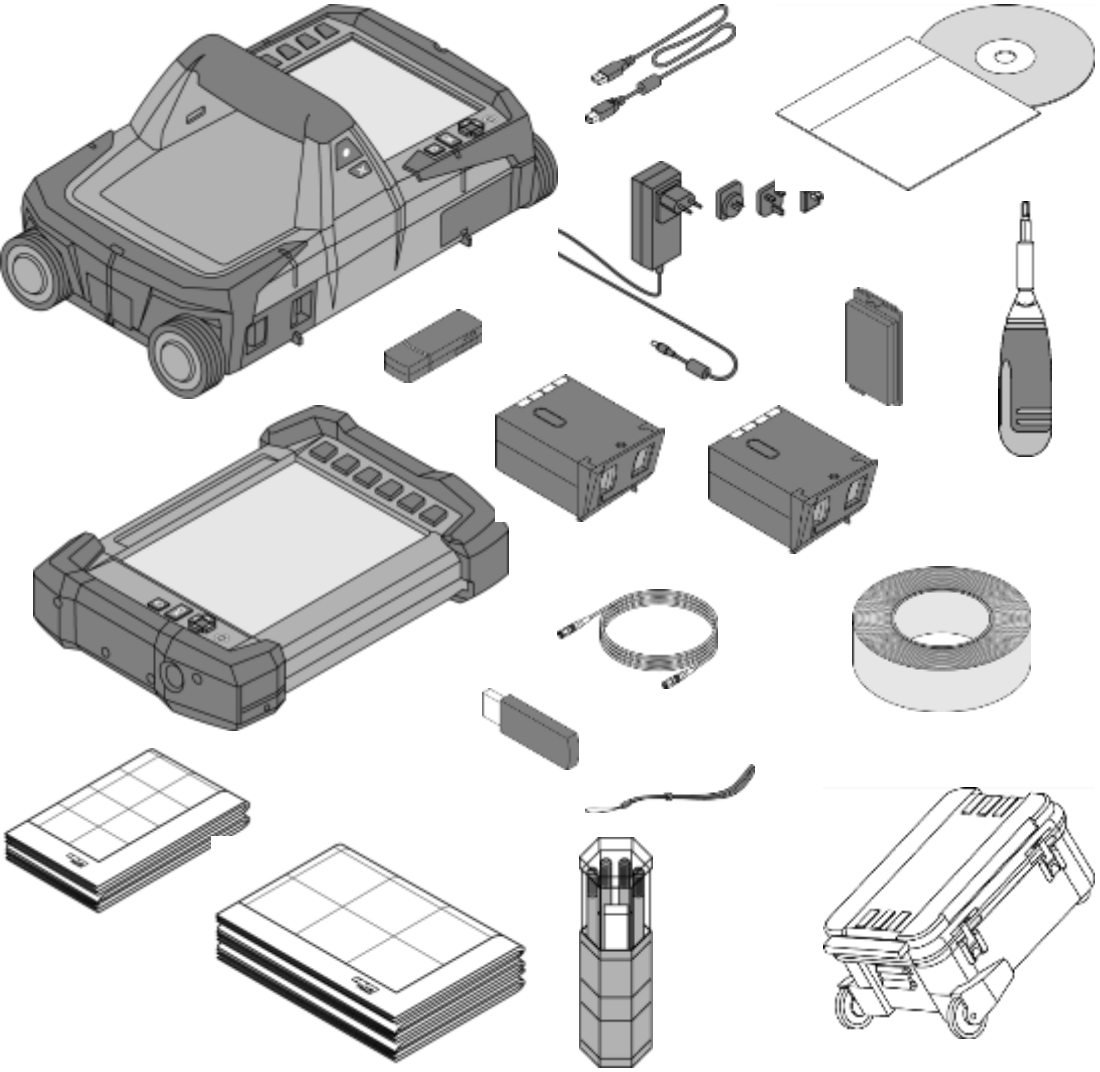
PS 1000 Sales Package



- 1 PS 1000 X-Scan
- 1 PROFIS PS 1000

- 1 PUA 81 mains adapter
- 2 PSA 81 battery packs
- 5 PSA 12/13 reference grids
- 2 PSA 14/15 reference grids
- 1 PSA 97 data module USB
- 1 PSA 95 memory card
- 1 PSA 96 adapter
- 1 PSA 75 brush
- 1 PUA 70 markers
- 1 PUA 90 adhesive tape
- 1 PSA 63 hand strap
- 1 PSW 1000-3 torch wrench
- 1 Producer certificate
- 2 operating instructions
- 1 Hilti box

PS 1000 System Sales Package



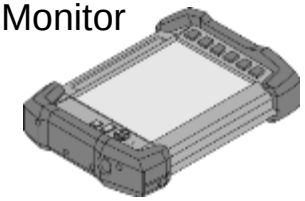
- 1 PS 1000 X-Scan
- 1 PROFIS PS 1000
- 1 PSA 100 Monitor

- 1 PUA 81 mains adapter
- 2 PSA 81 battery packs
- 5 PSA 12/13 reference grids
- 2 PSA 14/15 reference grids
- 1 PSA 92 data cable USB
- 1 PSA 82 battery pack
- 1 PSA 93 headset
- 1 PSA 50 connecting cable
- 1 PSA 97 data module
- 1 PSA 96 adapter
- 1 PUA 70 markers box
- 1 PUA 90 adhesive tape
- 1 PSA 63 hand strap
- 1 PSW 1000-3 Torch wrench
- 1 PSA 75 brush
- 1 Producer certificate
- 3 operating instructions
- 1 Hilti trolley

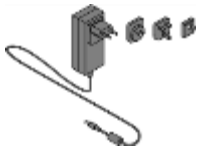
System Overview

The PS 1000 X-Scan is completed by rugged, simple and versatile accessories making it an unbeatable system!

PSA 100
Monitor



PSA 81
Battery pack

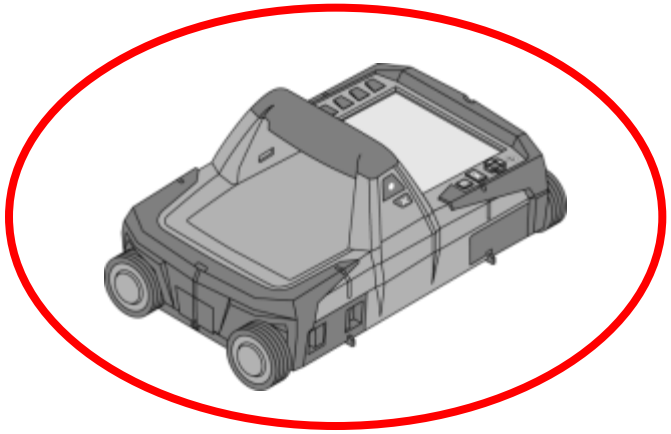


PUA 81 Mains
adapter

PSA 82
Battery pack

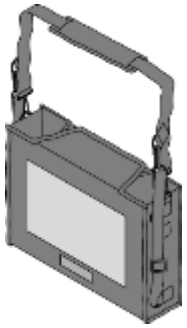
PSA 75 brush

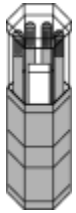
PSA 97 Data
module



PSA 92 Data
cable USB

PSA 93
Head set

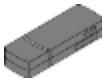




PUA 70
Markers box

PSA 95
Memory card

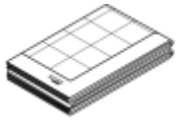
PSA 50
Connecting cable



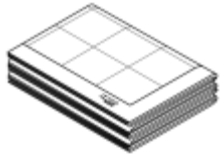
PSA 96
Adapter

PSA 64
Monitor
pouch

PSA 68 Hand
Strap

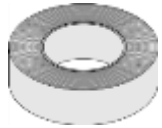


PSA 12/13
Reference grid



PSA 14/15
Reference grid

PUA 90
Adhesive tape



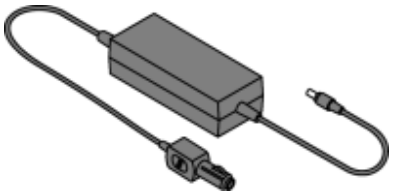
PROFIS
Software

Additional accessories to PS 1000 System

PSA 85 battery charger (monitor)

PSA 51 connecting cable (10 m)

PUA 82 Car battery plug



PSA 65 carrying device

PSA 70 extension

Technical data PS 1000 X-Scan

Max. detection range for object location	300 mm (dependent on object spacing, size and type of object, base material type and condition
Location accuracy (standard)	+/- 10 mm (+/- 1% of length)
Location accuracy (max)	+/- 5 mm
Min. distance between two neighbouring objects	40 mm
Accuracy of depth measurement	< 100 mm: +/-10 mm > 100 mm: +/-15%
Remark about accuracy of depth measurement	dependent on depth, size and type of object, base material type and condition; concrete parameter setting
Accuracy distance measurement	1%
Radar frequency range	1.0 -4.3 GHz (-10 dB)
Radar center frequency	2.0 GHz
Max. scanning speed	0.5 m/sec.
Min. scan length	320 mm
Max. scan length	10 m
Display type	TFT 5.7 "
Display resolution	640x480 pixel
Display color quality	256 colors
Display width x display height	115x86 mm
Memory capacity	approx. 200 Scans (SD), approx. 10 scans (internal flash memory)
Data memory	SD-card, internal flash memory
Operation time with Li-Ion battery pack	4 h
Automatic power-off	configurable
Scanner dimensions (length x width x height)	318x190x143 mm
Scanner weight	2.45 kg
Operating temperature	-10 -+50°C
Storage temperature	-25 -+63°C
Max. relative humidity	95% @ 40°C
IP protection class	IP 54

Technical data: PSA 100

Display type	LCD 8 "
Display resolution	800 x 600 pixel
Display color quality	true colors, 32 bit
Display width x height	173 x 130 mm
Memory capacity	approx. 500 Imagescans 8x8 or 2000 Imagescans 4x4 or 11500 Quickscans
Scanner - monitor data interface	Ethernet 100 Mbit/s
Operation time with Li-Ion battery pack	2h
Automatic power-off	configurable
Dimensions (length x width x height)	292 x 208 x 65 mm
Weight	2.26 kg
Operating temperature	-15 -+50°C
Storage temperature	-25 -+63°C
Max. relative humidity	95% @ 40°C
IP protection class	IP 54