In-depth 3D sub-THz scanner

TeraScan 100

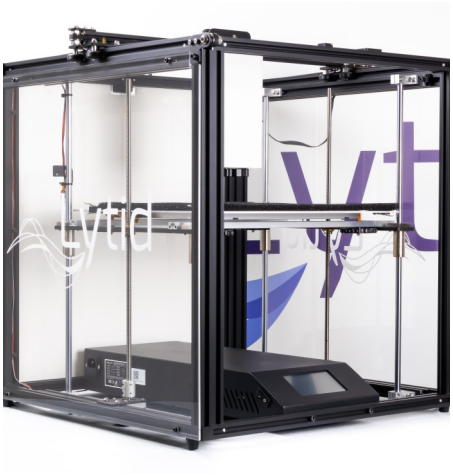
Turn key, all-in-one terahertz imaging solution

TeraScan Easy©, data acquisition software

TeraVisio 3D©, data visualisation software

Sub-THz FMCW radar transceiver

Best cost-benefit ratio on the market



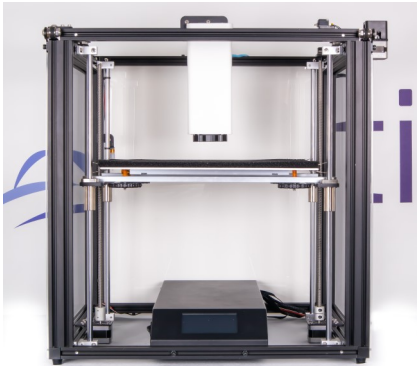
With increasing attention drawn into THz technologies for its inherent capabilities, the high cost of THz devices remained until now the main barrier for many potential users to explore the capabilities of THz imaging for industrial and science applications. For this reason, Lytid has developed a cost-effective scanner, TeraScan 100 as a tool to explore terahertz imaging applications in a offline setup. It naturally encapsulates both hardware and software to provide the user a turn key imaging tool. TeraScan 100 includes a 120GHz FMCW transceiver with 20GHz bandwidth mounted on x-y-z motorized translations stages to scan up to 300x300mm large samples. Combined with Lytid's custom designed interchangeable optics it delivers down to 1.8mm spatical resolution (x-y) or longer working distances (150mm) for thicker samples (with motorized z adjustment). In-house developed radar signal processing algorithms allow more than 60dB of dynamic range in a 100ms single shot measurement. The dedicated, included and free software tools TeraScan Easy© and Teravisio3D © allow the user to easily set up their sample scans and visualize easily the massive 3D data matrix acquired with the system.

What's inside the box of TeraScan 100 Kit

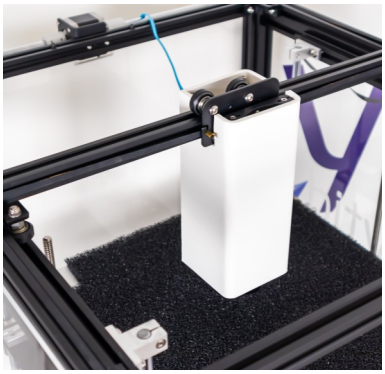
- A high performance FMCW radar transceiver at 120 GHz in combination with dedicated beam shaping THz optics operating in monostatic configuration

- Fully automated mechanical 3D scanning gantry frame offering a 300x300mm scan area

- TeraScan Easy© and TeraVisio 3D©, dedicated software suites for data acquisition and 3D imaging visualization.

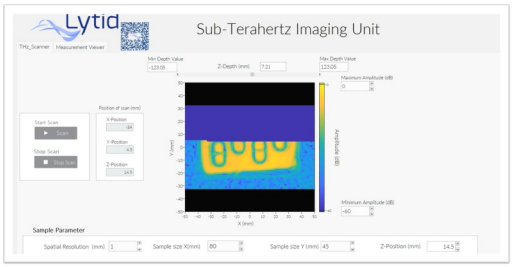


The 3D scanning gantry frame of TeraScan 100



The 120GHz transceiver head with user changeable optics

Technical specifications	TeraScan 100
Imaging resolution (50mm lens)	
Spatial resolution (x-y)	Down to 1.8 mm
Depth resolution (z)	~7mm
Imaging set up	
Imaging area	300 x 300 mm²
Smallest pixel pitch	0.5 mm
Acquisition rate	Up to 10Hz
FMCW Transceiver head	
Working frequency	120 GHz
Frequency band	~20 GHz
Supplementary option	Interchangeable lenses
	f = 40-75-100-150 mm
Dynamic range	Typ. 60 dB in single shot (100ms)
Scan time	
A6 (105x 148.5 mm)	~ 30 min
A4 (210 x 297mm)	~ 2H
Full size (300 x 300 mm)	~ 2H50 min



TeraScan Easy © scanner control software

Applications :

- In-depth inspection and sensing in dielectric materials
- Offline NDT tool for industry
- Material analysis (thickness, refractive index measurement)
- Security screening
- Teaching

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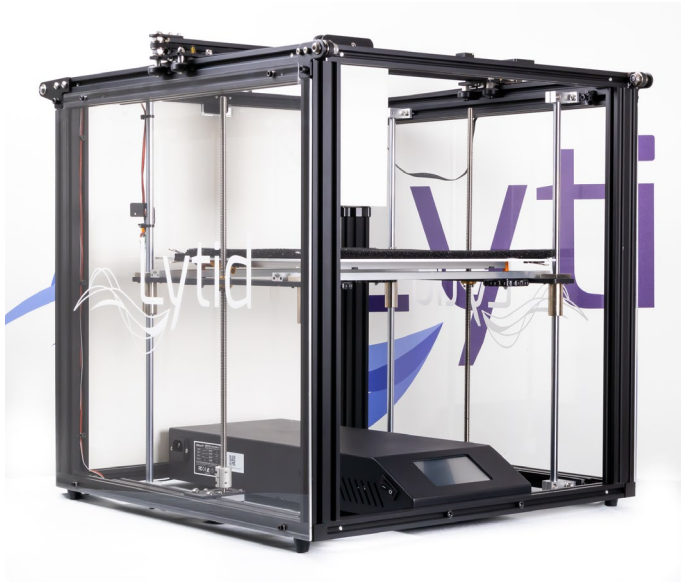
Lytid

Empower your application

New Product Release



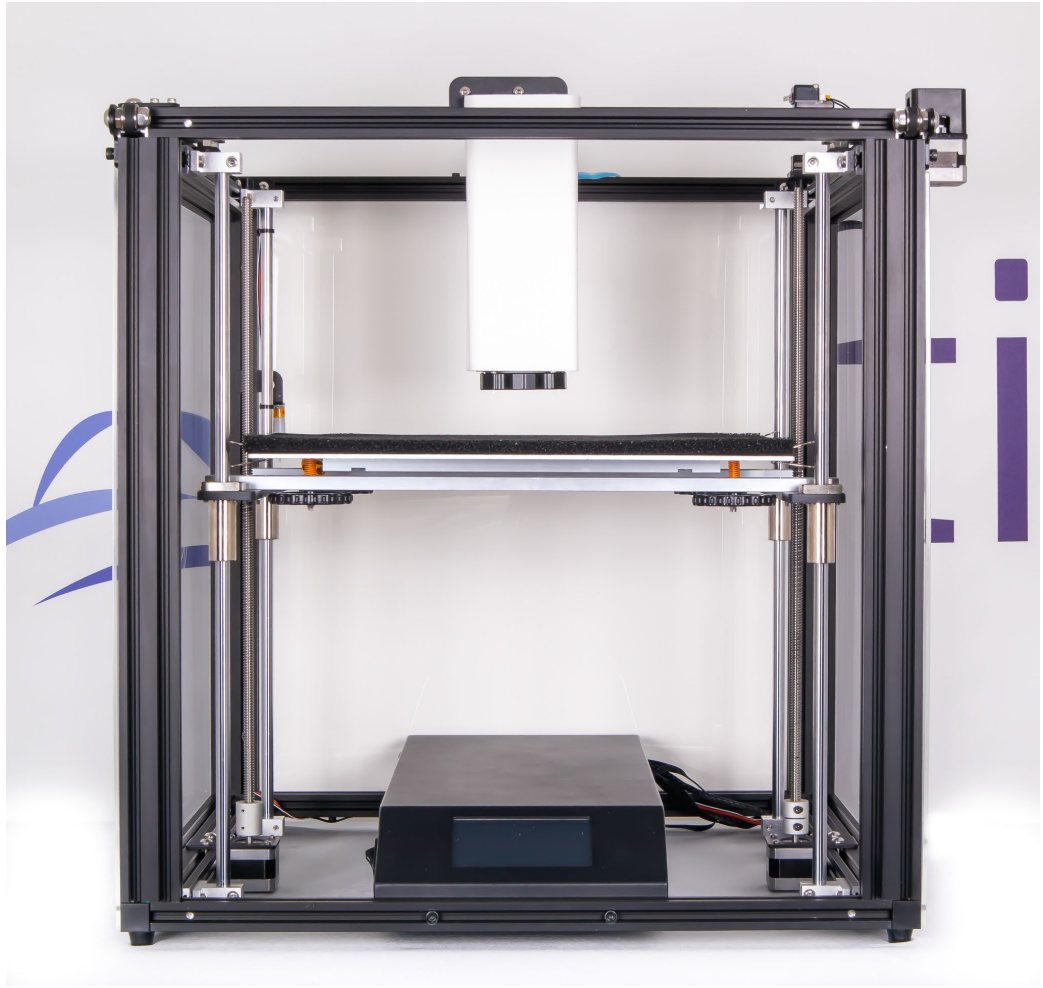
TeraScan 100

sub-THz 3D imaging scanner system

Boston Electronics

TeraScan 100 kit

In-depth 3D sub-THz scanner based on FMCW radar technology



Outline

- Introduction
- Inside the TeraScan100 box
  - Hardware, specifications
  - Software, functions
- Obtainable results
  - Imaging resolution
  - 3D in depth sensing
- Comparison between high-performance 150 GHz FMCW radar and 120 GHz TeraScan 100

Background

Goal : enable large scale diffusion of THz imaging technique

- **All-in-one** tool (hardware + software)
- **User-friendly**, plug & play,
- Applications: NDT sensing & imaging; teaching kit

Inside TeraScan100 box

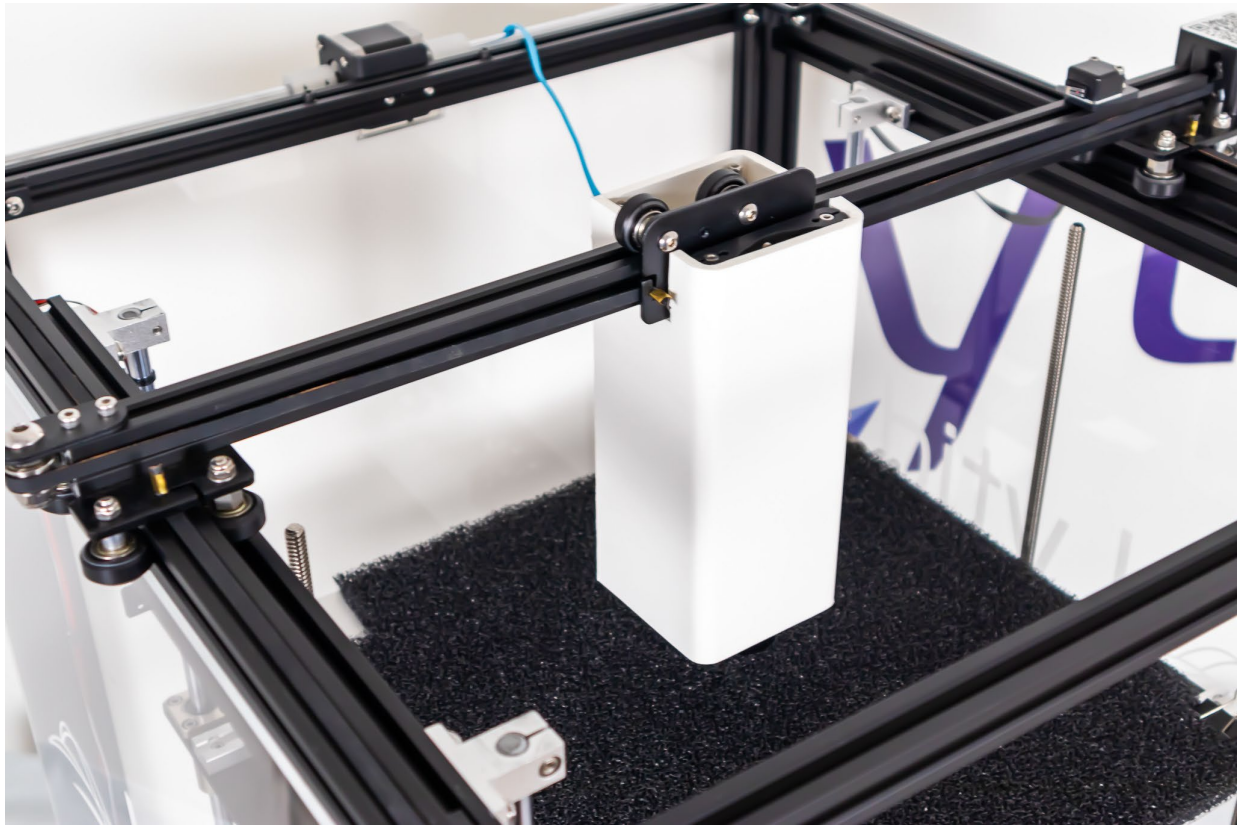
1. 120GHz FMCW radar **transceiver** in combination with beam shaping THz **optics**

2. Fully automated mechanical 3D scanning **gantry frame**

3. **TeraScanEasy**© software for data acquisition and scanner control

4. **TeraVisio 3D**©, 3D terahertz radar imaging processing and visualisation software

Inside TeraScan100 box



120GHz FMCW radar transceiver

(20GHz bandwidth)

in combination with

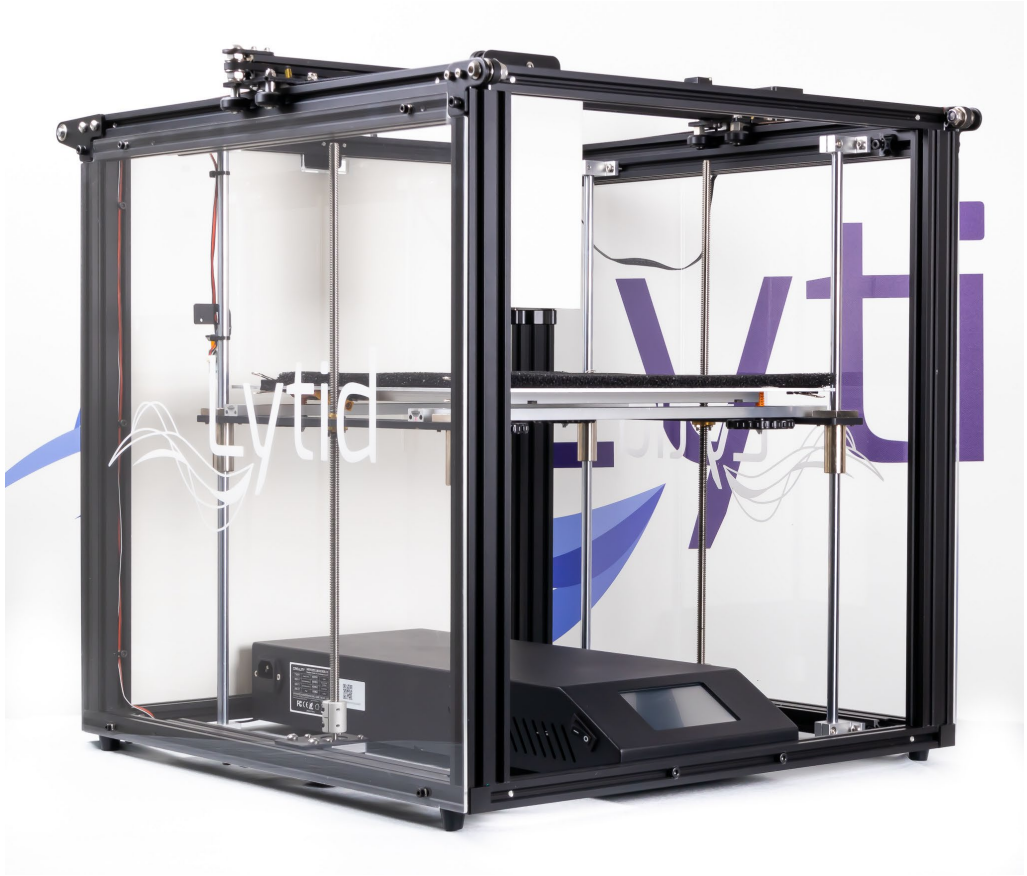
dedicated beam shaping THz optics

(interchangeable optics)

Spec:

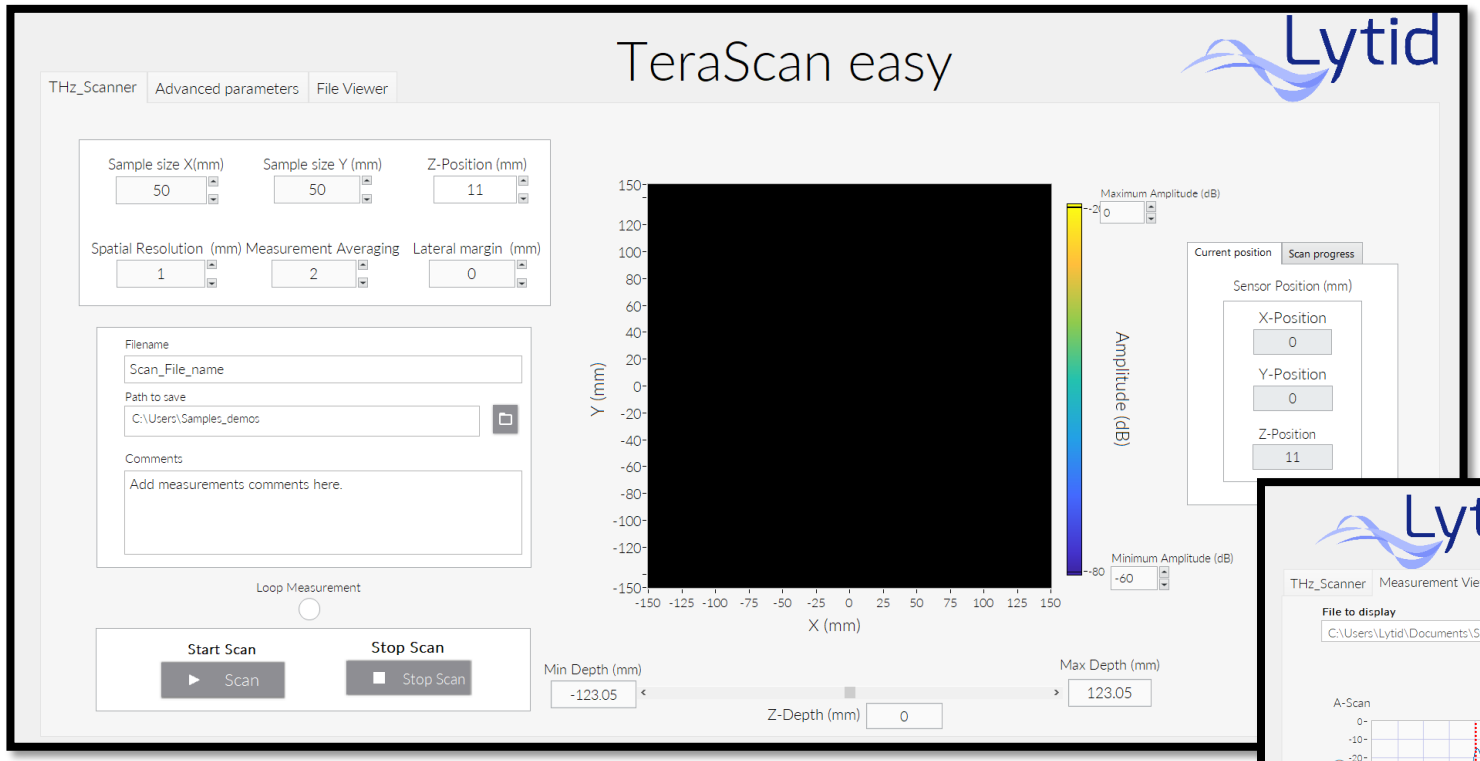
60dB dynamic range in single shot (100ms)

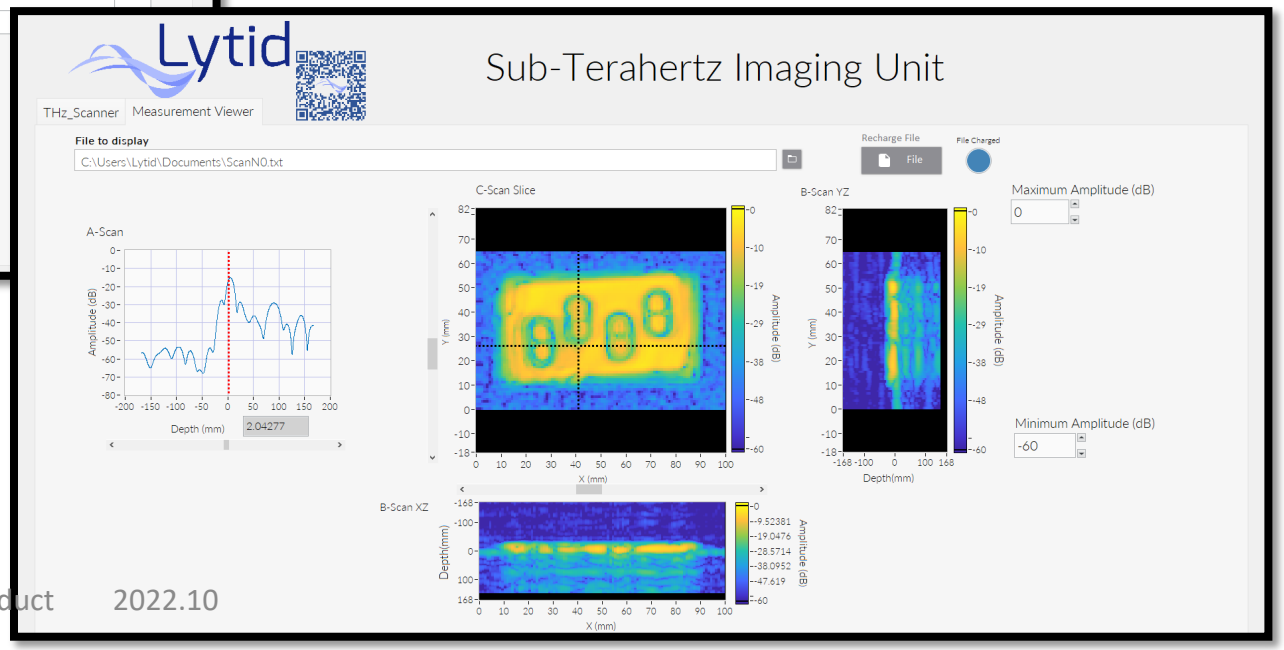
Inside TeraScan100 box



- **x-y-z motorized translation stages**
- **300×300 mm imaging area**
- **Pixel acquisition rate 10Hz**

Dedicated software





Sub-Terahertz Imaging Unit

THz_Scanner | Measurement Viewer

Min Depth Value: -123.05

Z-Depth (mm): 7.21

Max Depth Value: 123.05

Maximum Amplitude (dB): 0

Start Scan

Scan

Stop Scan

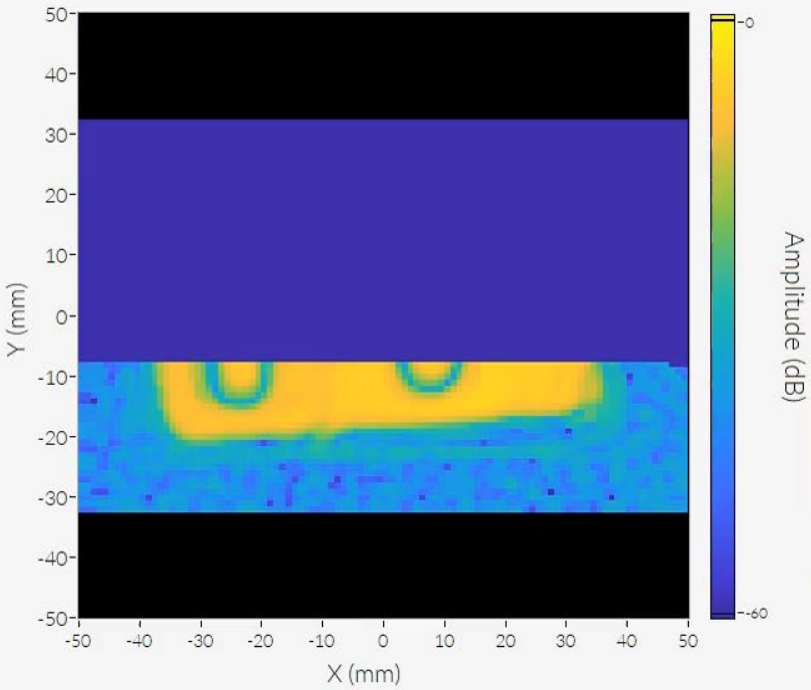
Stop Scan

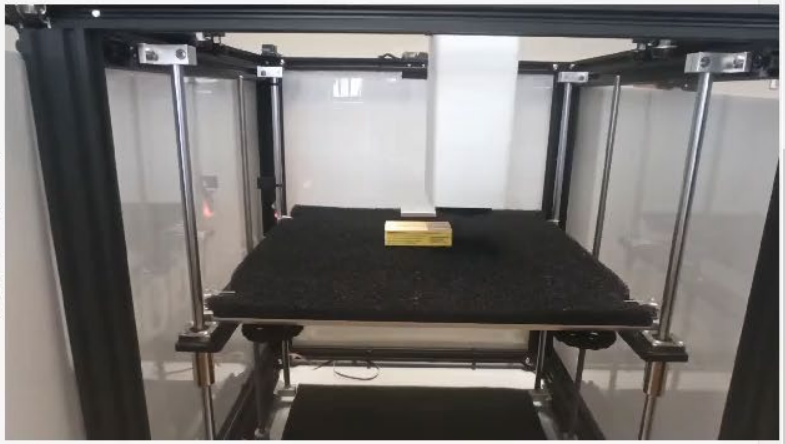
Position of scan (mm)

X-Position: 46

Y-Position: -8.5

Z-Position: 14.5





Minimum Amplitude (dB): -60

Sample Parameter

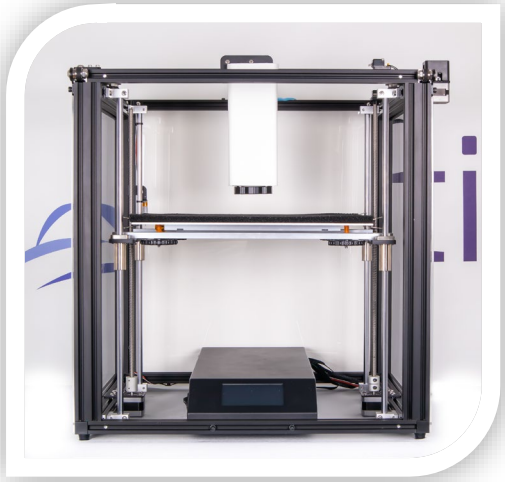
Spatial Resolution (mm): 1

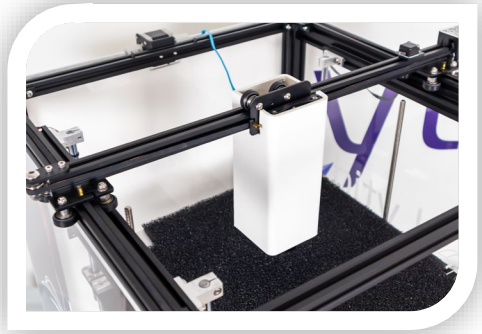
Sample size X(mm): 80

Sample size Y (mm): 45

Z-Position (mm): 14.5

Dedicated software





Main menu

THz_Scanner | Advanced parameters | File Viewer

TeraScan easy

Scan parameter setting

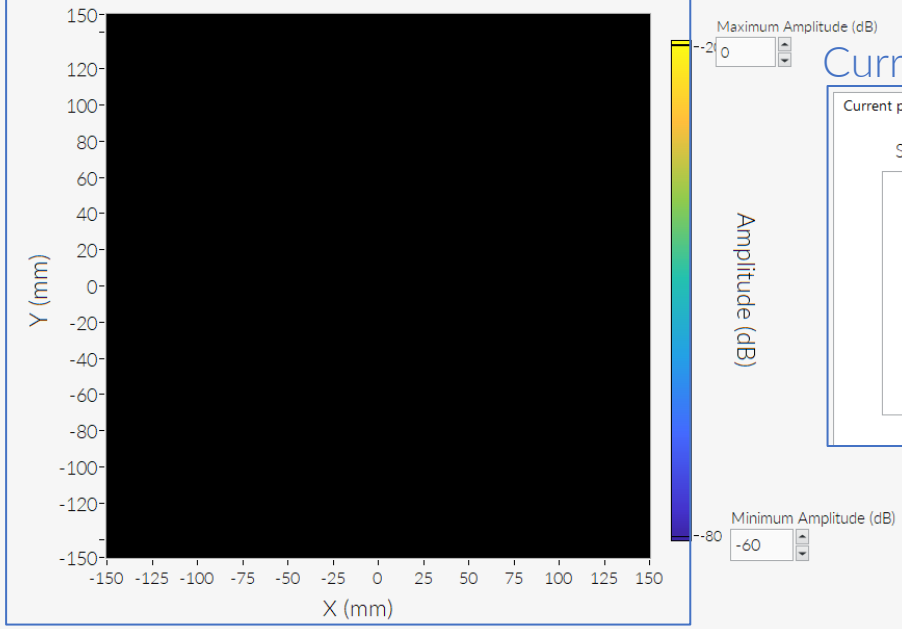
Sample size X(mm): 50
Sample size Y (mm): 50
Z-Position (mm): 11
Spatial Resolution (mm): 1
Measurement Averaging: 2
Lateral margin (mm): 0

Filename: Scan_File_name
Path to save: C:\Users\Samples_demos
Comments: Add measurements comments here.

Loop Measurement

Start Scan: Scan
Stop Scan: Stop Scan

Real-time data acquisition



Current position

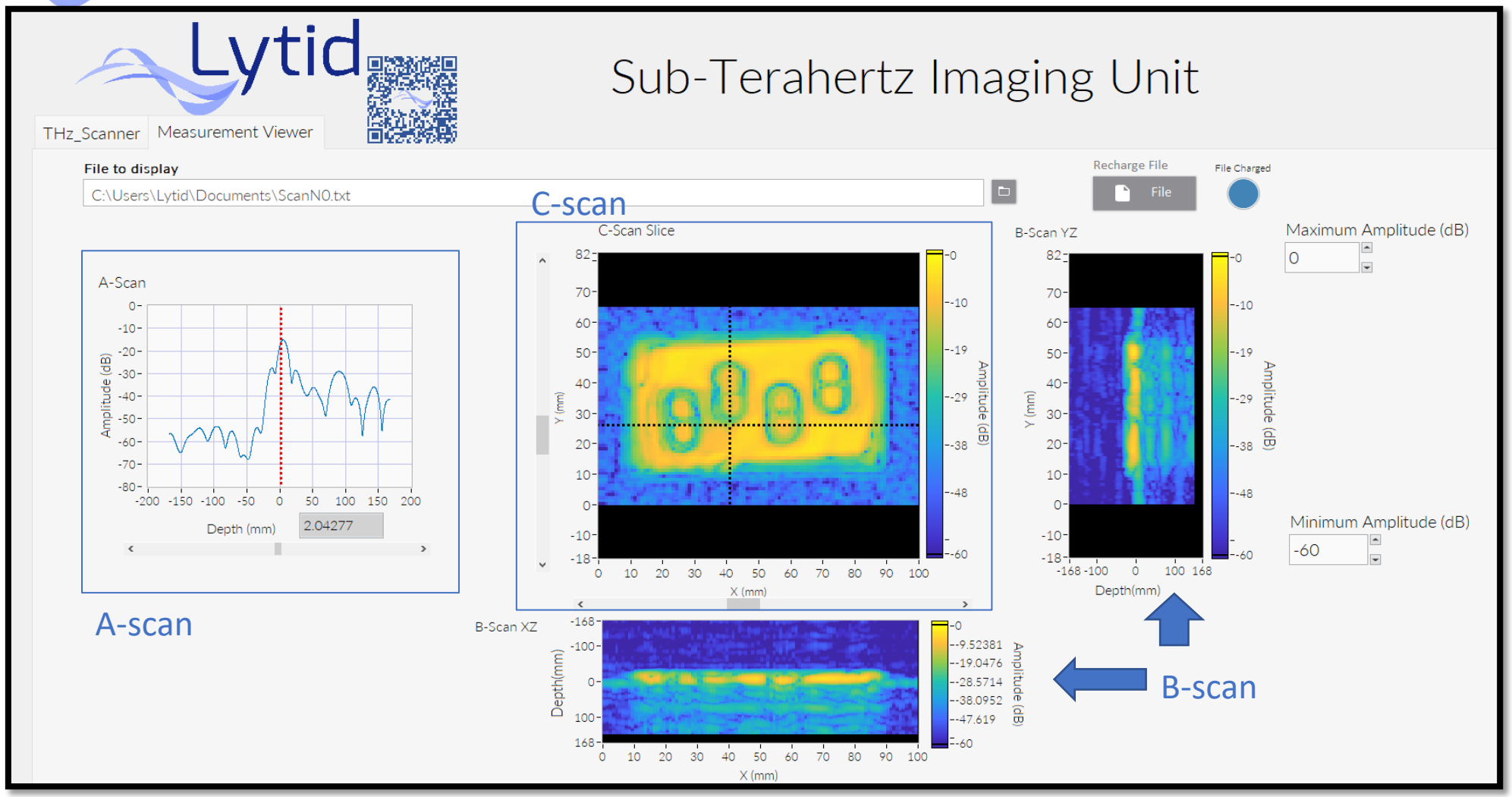
Current position | Scan progress

Sensor Position (mm)
X-Position: 0
Y-Position: 0
Z-Position: 11

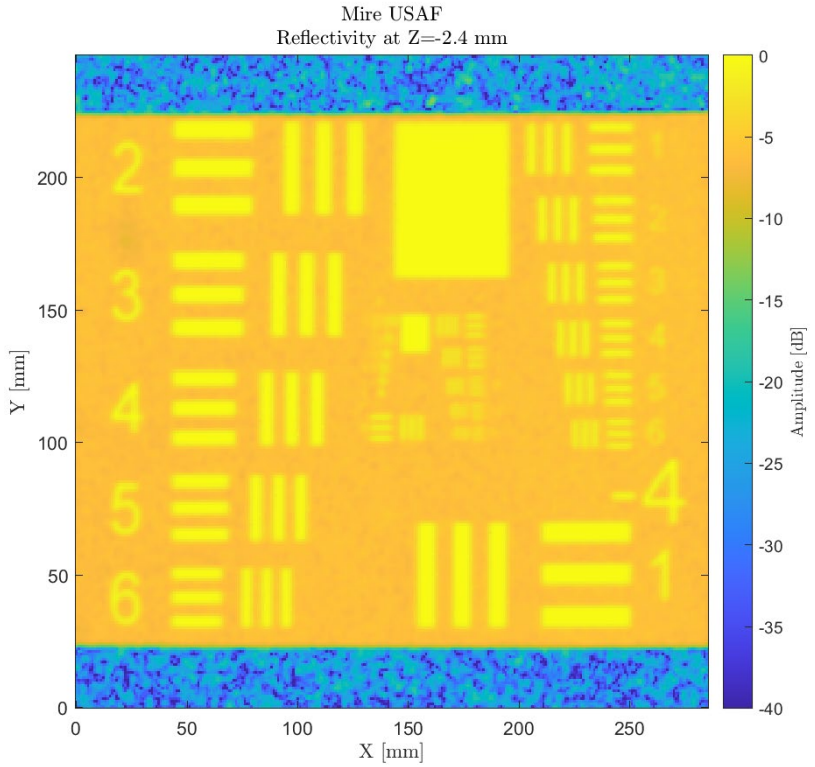
Select depth

Min Depth (mm): -123.05
Max Depth (mm): 123.05
Z-Depth (mm): 0

Dedicated software



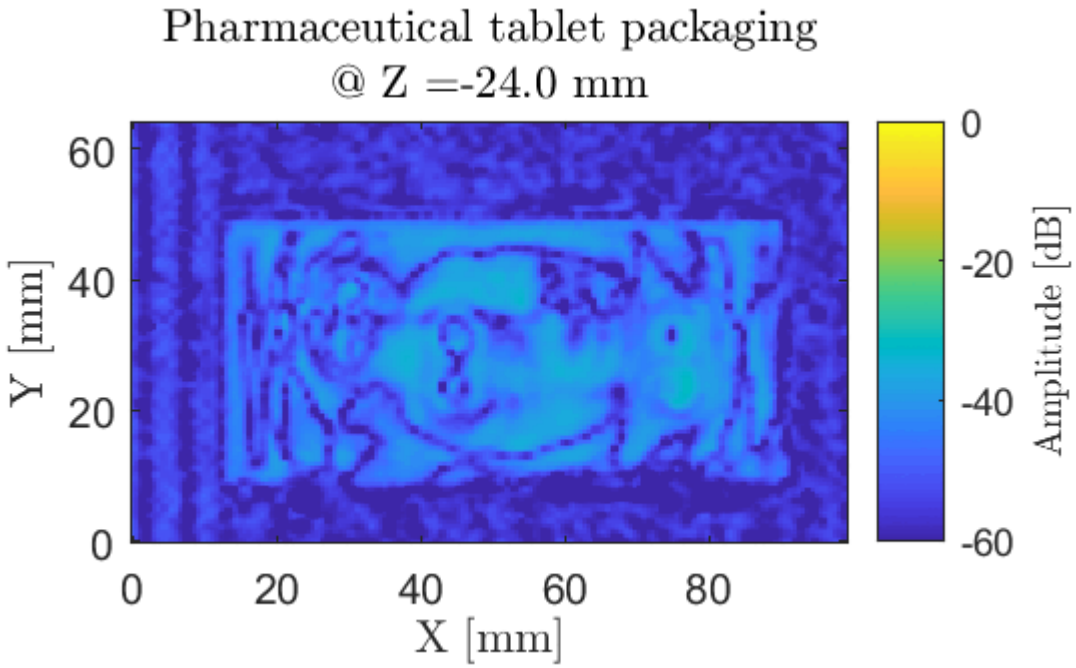
High resolution 3D terahertz images



Imaging capabilities

- 1.8mm spatial x-y resolution with 50mm lens
- Down to 0.5mm scan steps
- 300×300 mm imaging area
- Full area scan time : 2h30

In depth image analysis



3D depth imaging

- 7mm depth resolution
- 20GHz radar bandwidth
- TeraViso 3D data visualization software

TeraScan 100 compared to Lytid High-performance FMCW radar

	TeraScan 100	FMCW radar
Frequency range	~120 GHz	~150 GHz
Bandwidth	~20 GHz	~30 GHz
Working principal	FMCW radar	
Configuration	Reflection	
Max acquisition speed	~10 trace/s	7600 trace/s
Dynamics	~60 dB	up to 90 dB
Stability	+ (auto-reference)	+++
Price	€	€€€€
Integration in industry	✘	✓

Price, delivery

- Standard price (see our web store for current prices):
  - unassembled kit (easy to assemble by following user guide and video)

- Shipping :
  - EXWorks
  - Box: 75x75x30 cm, (~25-28Kg) ~60lbs.

Conveniently purchase the TeraScan 100 online:

https://shop.boselec.com/collections/thz-sources-and-detectors/products/terascan-100-sub-thz-3d-imaging-scanner

A new light is coming…

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