

Led by experience. Driven by curiosity.

FF20 CT

Highest resolution inspection of
fine parts in science & research.



comet
yxlon



Comet Yxlon – this is who we are.

Comet Yxlon designs and manufactures high-end X-ray and CT system solutions for industrial environments – based on customer-centric product development. We're proud to be part of Comet, the globally leading Swiss technology company with a focus on plasma control and X-ray technology.

**Led by experience.
Driven by curiosity.**

Deeper insights.

Looking beyond the surface is our core competency at Comet Yxlon – not only in a technical way.

Zooming in on your industry, applications and business challenges allows us to develop innovative and relevant solutions that help you shape future markets. Faster time to market? Avoiding production downtimes? The perfect image with the highest resolution, as fast and easy as possible? Whatever your goals – let's talk about it!



The FF20 CT's 190 kV nanofocus transmission tube delivers high detail visibility.

Your benefits with the FF20 CT:

- Accurate material analyses in lab applications
- 2D detail visibility of down to 150 nm with 190 kV transmission tube
- Vista software packages for best-in-class image quality and speed
- Precise manipulation and temperature stability
- Intuitive user interface

High energy. Maximum precision.

The FF20 CT is the expert micro-CT system for inspections of very fine parts and internal structures in the electronics industry, material science and many other research areas.

Which items can be inspected with the FF20 CT?

Electronic components incl. SMD
Semiconductor packages
Battery cells
Injection molded plastics
Products involving new materials or manufacturing methods, e.g. AM components, fiber-reinforced plastics
Microsystems (MEMS, MOEMS)
Medical objects, e.g. cannulas
Geological, paleontological and biological samples

Which applications is it designed for?

Quality assurance, material analysis, material research
Failure and structure analysis
Assembly checking
Inspection of small serial productions
Process control
Digitization
Segmentation

190 kV transmission tube

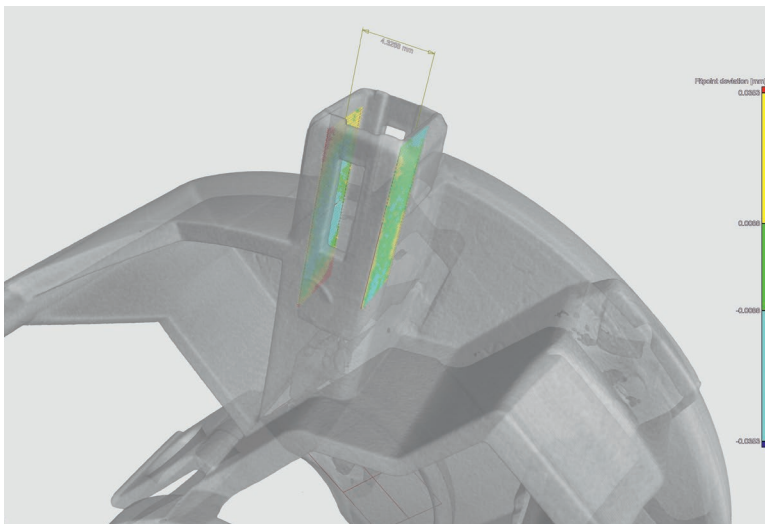
The 190 kV nanofocus transmission tube of the FF20 CT achieves a detail visibility in radioscopy (2D) of down to 150 nm. While its water-cooled target and coils allow for quick temperature balance and highest focal spot stability, four modes enable the optimal adjustment of the focal spot size in relation to power.

Granite-based manipulator

The granite-based manipulator of the FF20 CT system guarantees temperature stability and smallest thermal expansion for maximum precision and accuracy. It features six axes with a high-precision Heidenhain encoder for utmost versatility of applications.

That's versatility: Choice of two detectors to match your needs

The 4343 CT delivers top performance for small to large parts with a pixel size of 150 µm and an active area of 432 x 432 mm. For even smaller details, our 3131N with a pixel size of 100 µm may be the perfect choice.



Dimensional metrology with highest accuracy.

The FF20 CT Metrology.

With its ability to capture nearly unlimited measuring points in one CT scan decoupled from the measurement evaluation, the metrology version of the FF20 CT takes accuracy to the next level. Seamless defect analysis and nominal-actual comparison save time and reduce correction loops. Smart fan control enables the stabilization of the interior temperature, making the FF20 CT Metrology compliant with temperature range regulations defined by VDI 2627.

Software solutions for accurate, repeatable, fast results.

See better, faster, more: Our wide range of integrated and optional software features for the FF20 CT facilitate inspection workflows with exceptional results in clarity, efficiency and insights.



More clarity, efficiency and insights

Comet Yxlon image software solutions are as diverse as your applications. In order to supply you the best inspection results, we have structured our Software Suite into three interconnected pillars, serving three specific areas of interest.

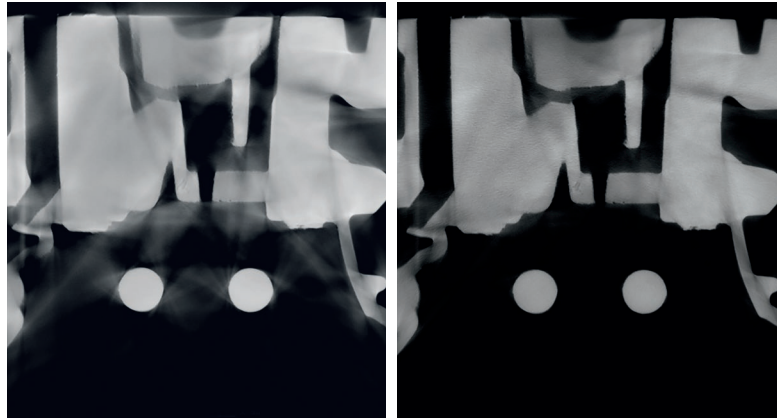
"Clarity" focuses on detail-rich image acquisition, by offering a wide range of easily adjustable scan trajectories and image optimization tools, which allow you to see more details in your inspection part while saving time. "Efficiency" helps you streamline workflows through seamless connectivity and automation.

Last but not least, "Insights" features powerful solutions for image analysis and process control. It enables you to improve product and process quality by extracting critical information from image data – and to stay ahead of your market.

Image quality optimizations.

ScatterFix 2.0

The innovative ScatterFix 2.0 functionality developed by Comet Yxlon reduces scatter radiation to improve the quality of the CT data, e.g. for optimized surface determination.



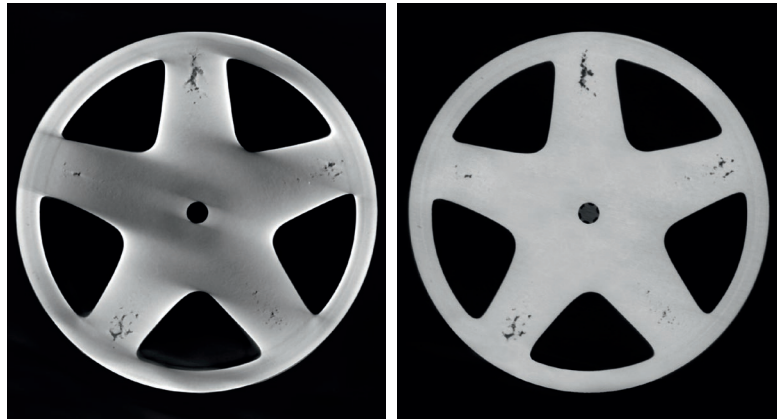
Improving image quality: Cone-beam CT without (left) and with ScatterFix 2.0 (right).

Beam hardening correction (BHC)

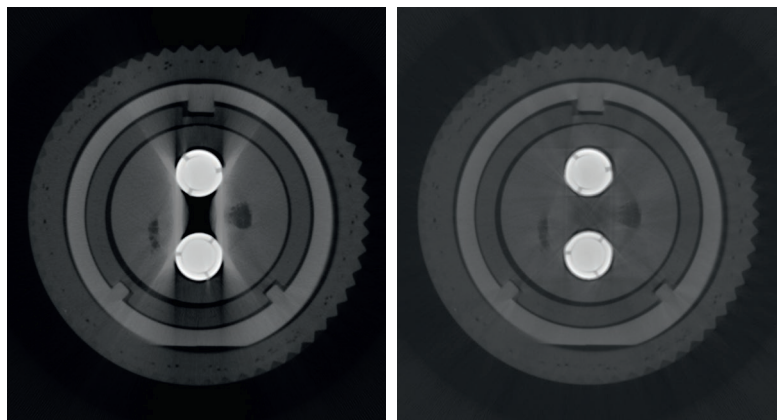
It allows the correction of unwanted gray-value gradients in otherwise homogeneous materials, e.g. in order to reliably carry out a pore analysis.

Metal artifact reduction (MAR)

With complex components consisting of plastics and metals, MAR significantly reduces the interfering effects causing the less dense material to 'disappear'.



Eliminating unwanted gray-value gradients: Cone-beam CT without (left) and with Beam Hardening Correction (right).



Reducing interferences: Cone-beam CT without (left) and with Metal Artifact Reduction (right).

Intelligent CT trajectories.

Collision protection

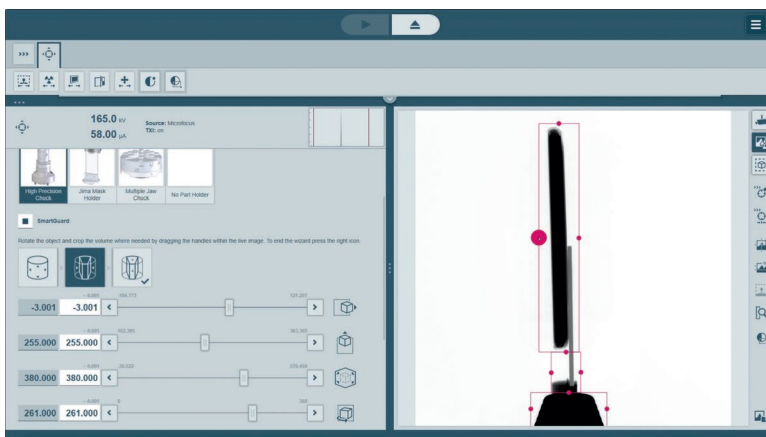
The intuitive SmartGuard takes collision protection to the next level. Benefit from highest magnifications without risking damage to part or system by following the exact outline of your part.

Helical scan trajectories

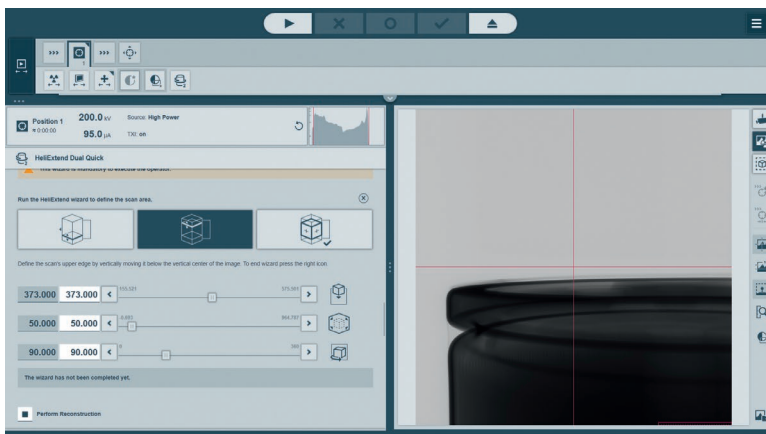
Helical scan trajectories avoid cone beam artefacts when scanning high parts. We offer two versions: HeliExtend and HeliExtend Dual. The Dual version combines offset and helical scan trajectories for very high parts. Both are available as QuickScan or QualityScan. The QuickScan offers 3 to 5 times faster scanning.

Scan extensions

Our ScanExtend trajectories offer horizontal field-of-view and vertical field-of-view extensions as QuickScan or QualityScan.



Highly precise manipulation: The SmartGuard wizard allows to define the exact contours of (asymmetrical) test parts.



The scan set-up of a dual helical scan is fast and intuitive thanks to our wizards which calculate the geometric offset automatically based on the magnification.



Our three Vista packages.

Opening new horizons: With first class image quality and unprecedented speed, our Vista packages significantly increase productivity. Choose between three well thought-out packages with different features to meet your requirements.

Vista.

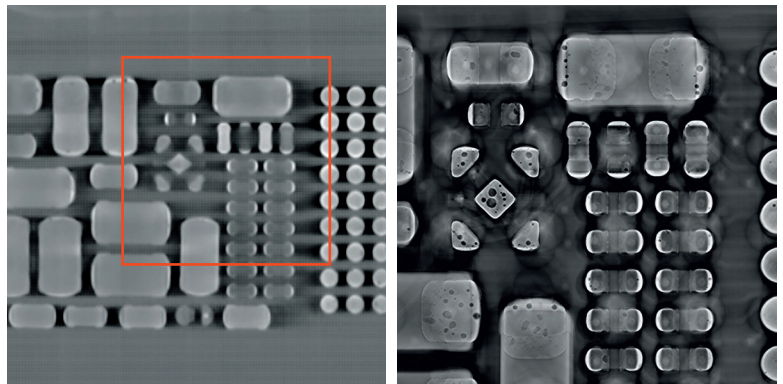
The best-in-class entry-level package. In addition to QuickScan and QualityScan it contains these features:

SpeedMode

Achieve up to three times* faster scans for parts of a flat geometry than with the classic QualityScan while keeping image detail resolution.

FlexCenter

Your ROI is not in the center of the turntable? FlexCenter provides a flexible rotation axis – no need for part repositioning.



Conventional CT scan: resolution 14 μm , 40 min scan time.

LayerScan (Vista X Pro): resolution 0.9 μm , 12 min scan time.

Vista X.

In addition to all features of the Vista package, Vista X also comprises ZoomScan offering unrivaled resolution:

ZoomScan

Increase your resolution by up to ten times* compared to QualityScan. Just combine SmartGuard with the revolutionary ZoomScan feature, and the system follows your part's exact outline. Additionally activate the SpeedMode to increase scan speed by up to three times*.

Vista X Pro.

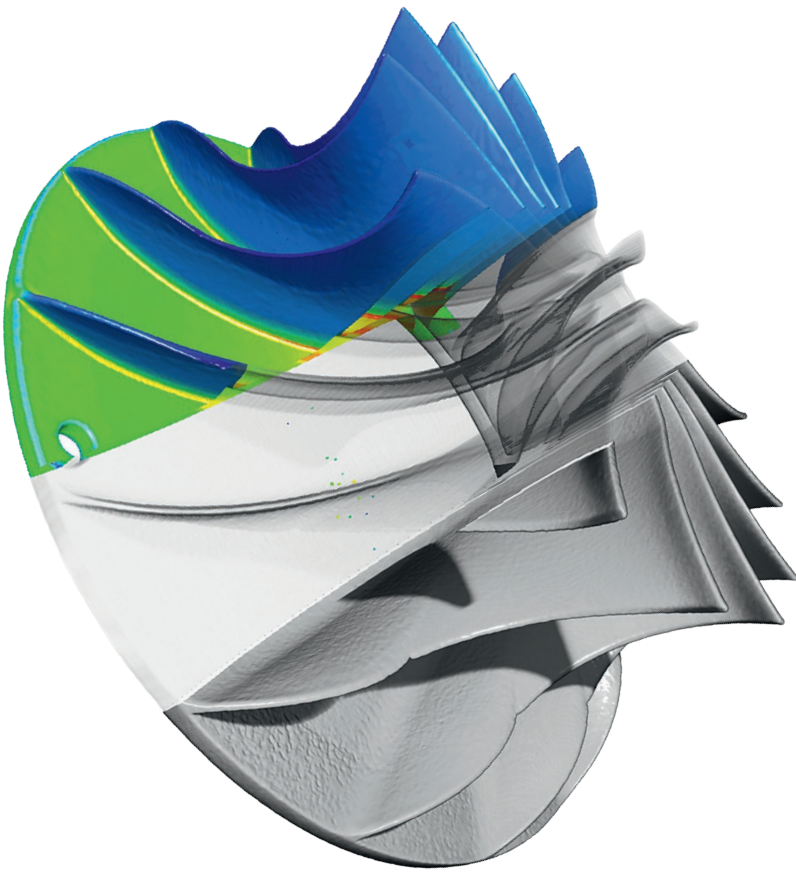
Setting new standards in productivity: In addition to all Vista X features, Vista X Pro also contains LayerScan.

LayerScan

The Comet Yxlon computed laminography solution is the most efficient technology for highest resolution slice images of flat parts without the need for 360° rotations. Furthermore, it accelerates the scan speed by up to five times*.

* Achieved magnification and acceleration of scan times depend on the geometry of the part.

Dragonfly 3D World: next-level 3D visualization and analysis – powered by AI.



Dragonfly 3D World allows all kind of analysis tools like porosity or wall thickness analysis.

From counting to measuring, from fast segmentation to stunning visualization: Dragonfly 3D World's powerful AI-based quantification and analysis tools enable industrial users to unleash the true potential of scientific image processing.

Size, shape, and spatial properties

Make measurements on hundreds to millions of individual grains, pores, organelles, etc. Select from volume, surface area, Ferret diameter, aspect ratio, roughness, sphericity, and scores of additional measurements.

Porosity and void analysis

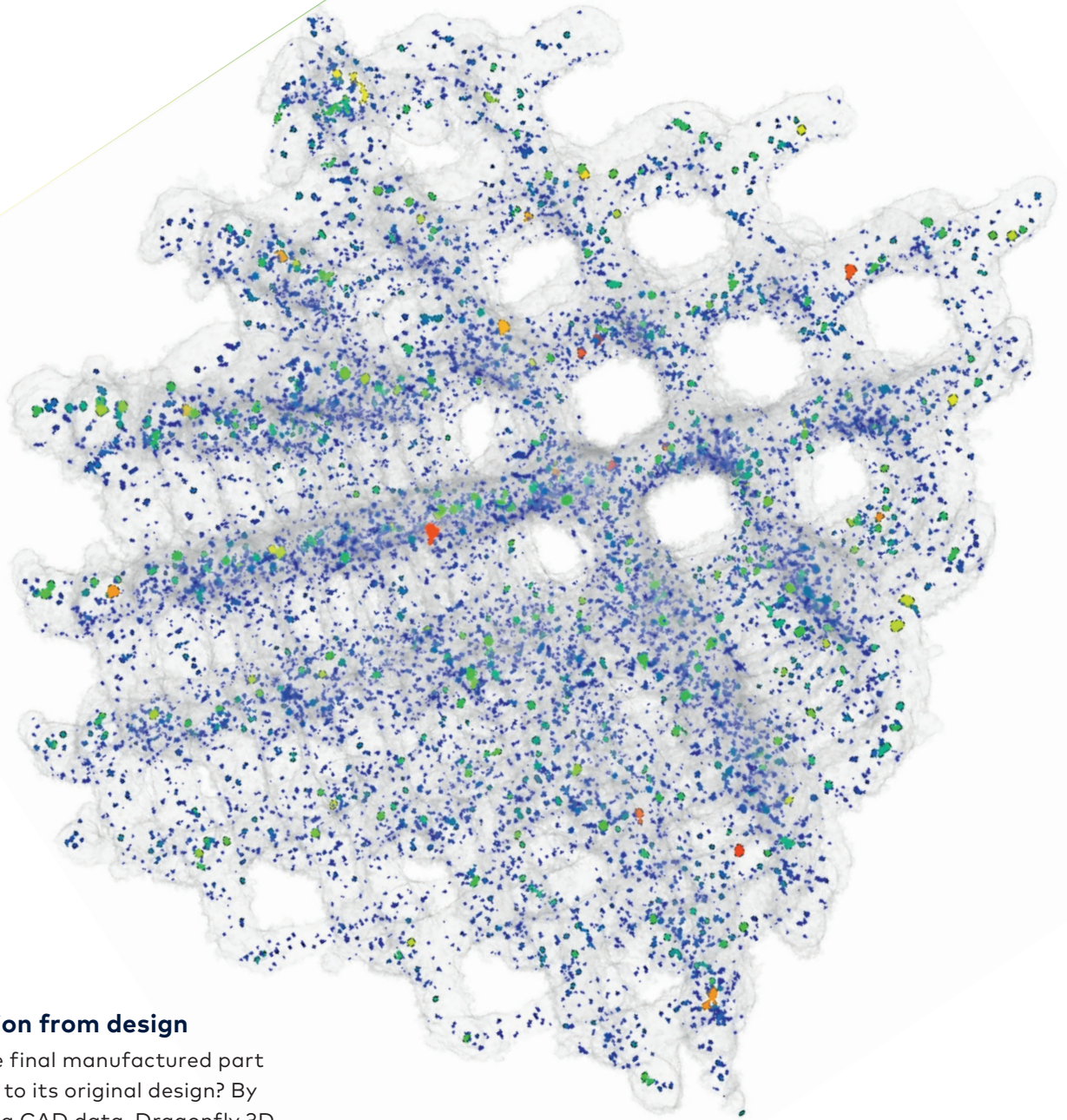
Dragonfly 3D World's automated thresholding tools enable a fast and efficient segmentation of casting or electronics parts. Porosity and voids can be calculated, visualized, and analyzed by size or volume using color coding.

Meshes and models

Compute high-quality surface mesh models directly from images or from segmentations.

Wall thickness analysis

Effortlessly determine the wall thickness distribution of a part and visualize it in 3D renderings. Perform statistical analysis on the results or export them for further processing.



Deviation from design

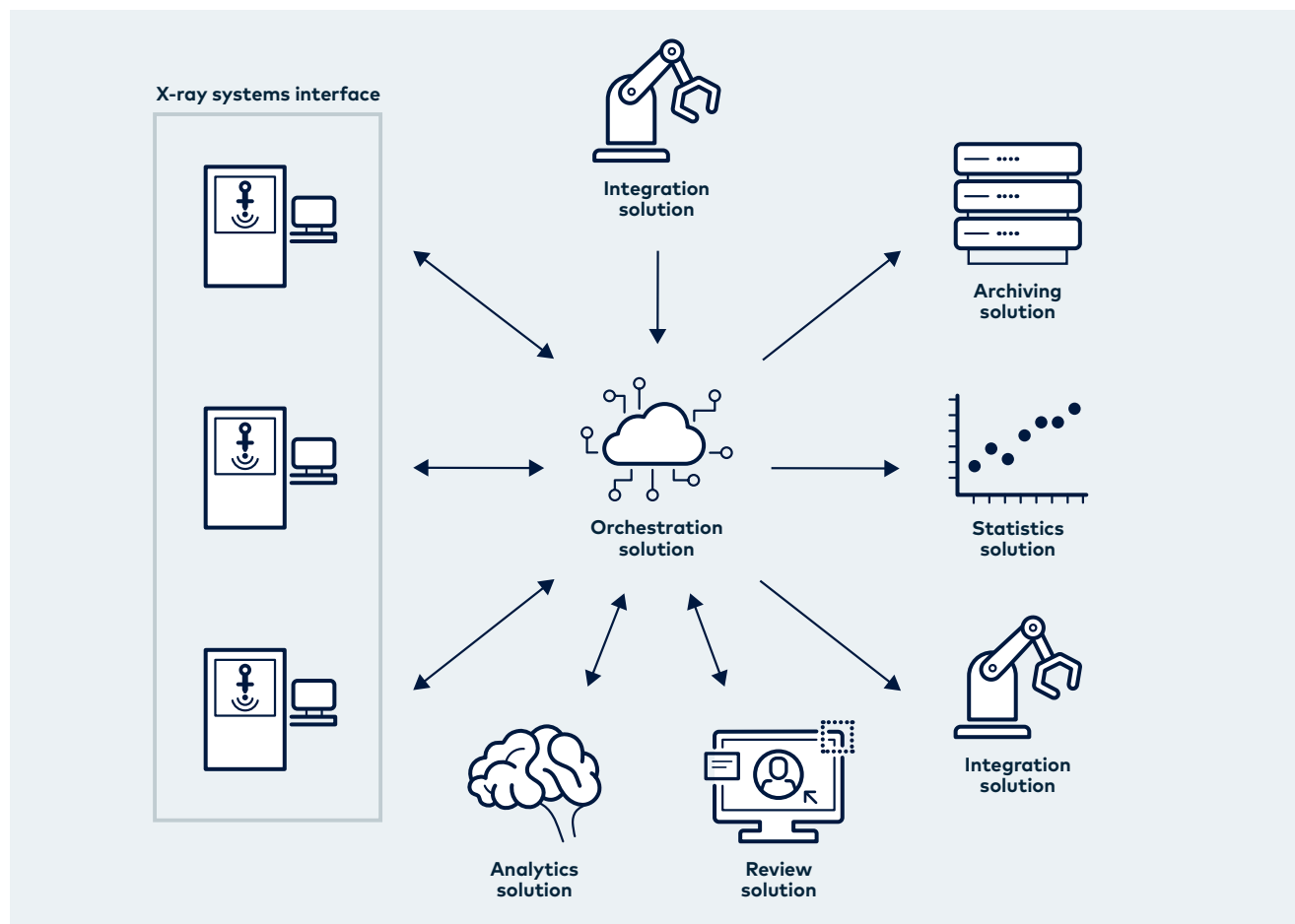
Does the final manufactured part conform to its original design? By importing CAD data, Dragonfly 3D World enables a comparison between planned design and actual part. Color coding can be used to highlight the largest deviations or warping.

Automate your analyses

With Dragonfly 3D World, many inspection tasks can be automated. Just one example: the segmentation and measurement of battery overhang distances. Deep learning based analysis tools boost the speed and efficiency of the inspection processes.

Example of high-resolution scan of a lattice structure (sample width is 6 mm for scale). The segmentation was performed using the Dragonfly 3D World automatic Otsu thresholding method.

More efficiency through connectivity and automation.



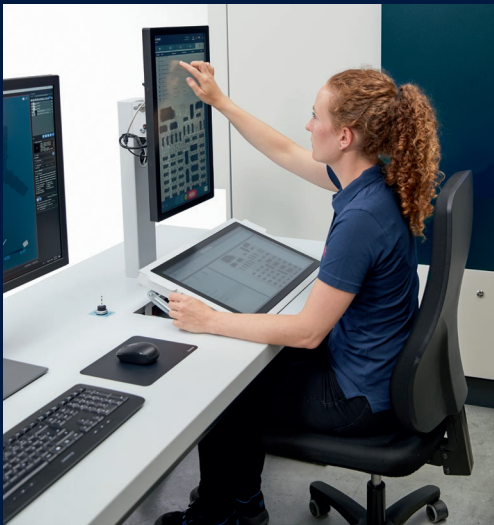
Batch Manager

Increase your automation and process efficiency by loading multiple parts into the system at the same time. Set up your inspection for one part and the Batch Manager will run it for all loaded parts. The Batch Manager is fully compatible with the other software solutions of the Comet Yxlon Software Suite.

Automatic Data Transfer

Automatic Data Transfer helps you access X-ray data from your IT infrastructure fully automatically and without compromising security. The generated data is automatically transferred to a fileserver outside of the X-ray system, which can be configured according to the local IT policy.

Ergonomic. Intuitive. Accessible.



In the FF20 CT, software and hardware work hand in hand to make system operation as easy as possible. The clean layout of the operator desk with tiltable touchscreens allows users to stay focused on the inspection task. The height of the desk can be adjusted, facilitating operation from a sitting or standing position. Healthmonitor and push messages keep the user informed about system status and inspection progress at all times.



Gemini's Healthmonitor shows the current system condition.

Our supportive Life Cycle Service.

At Comet Yxlon, service is not an add-on, but an integral part of every product. We support you through the entire life cycle of your system – for easy operation and extended product life.

Offline applications, at-line scenarios, or in-line implementation – Comet Yxlon supplies tailored service solutions for a wide range of production environments. Whether you are an X-ray beginner or a CT expert, whether you need introductory training or a performance upgrade: Our service team is here to support you.

1. Getting you started

Our professional Comet Yxlon field service technicians or certified service providers will ease your way into working with your new inspection system.

- Bringing the system to life: installation & commissioning
- Power on: introductory training by Comet Yxlon Academy
- Correct measurements from the start: SmartCalibration
- Cost transparency from the beginning: flat fee service rates

2. Running things smoothly

Is there an issue? No problem. Our skilled service technician team helps with troubleshooting, maintenance, and part exchange for easy operation.

- High efficiency thanks to remote control and VisualAssist
- Professional phone support and on-site visits
- Preventive maintenance and SmartExchange
- High-end system monitoring with SmartCalibration

3. Enhancing performance

With our upgrades and conversion kits, your Comet Yxlon system remains in top-notch condition and keeps its value as market demands change.

- System release upgrades, feature & performance upgrades
- Component upgrades
- System software upgrades
- Advanced Academy training

Tailor-made Service Level Agreements

Our Service Level Agreements are based on different performance factors, e.g.

ServicePass – for fast reaction times and seamless maintenance

SmartPass – focusing on the highest possible system availability

LifeCyclePass – the all-inclusive premium contract for guaranteed life-cycle-costs

Please contact us to learn more about the specifics of our different service contracts!

FF20 CT in numbers.

Inspection parts

Max. part size (Ø x H)	430 mm x 700 mm ¹⁾	
Max. inspection envelope 3D (Ø x H)	380 mm x 380 mm or 230 mm x 425 mm (for 3131 N)	430 mm x 320 mm or 320 mm x 410 mm (for 4343 CT)
Max. part weight	17 kg	

X-ray source

FXT-190.61

Tube type	nanofocus, open
Energy range	20 - 190 kV ²⁾
Max. power	80 W
Max. target power	15 W
Focal spot size	<1 µm
Spatial resolution ³⁾	0.6 µm
Features	TXI ⁴⁾ , multifocus, cooled

Detector

Flat-panel detector 3131 N

Flat-panel detector 4343 CT

Active area	307 mm x 307 mm	432 mm x 432 mm
Pixel matrix	3,072 x 3,072	2,880 x 2,880
Pixel pitch	100 µm	150 µm
Max. frame rate	75 fps	30 fps

Manipulation

Focus-detector distance (FDD)	up to 790 mm
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Cabinet / System

Dimensions (W x D x H)	2,380 mm x 945 mm x 2,180 mm (w/o levelling wedges)
Weight	~ 3,400 kg
Loading door clearance (W x H)	600 mm x 790 mm
Mains connection	3-phase 230 / 400 V AC ±10 %, 50 / 60 Hz, zero, ground; transformer available
Max. power consumption	1.9 kVA

Option

FF20 CT Metrology

Features	as above, but without virtual rotation axis FlexCenter
Air conditioning inside cabinet	yes, temperature range referring to VDI 2627 measuring room quality class 3
Systems ambient conditions	measuring room quality class 4
Measuring accuracy MPE SD ⁵⁾	3.9 µm + L/75 [L = mm]

¹⁾ Collision-protected by manual definition of cylinder. ²⁾ For local requirements, FF20 CT energy range may be limited via hardware to max. 160 kV.

³⁾ Measured with JIMA RT RC-02B or HiCo micro-chart test specimen. Acceptance Criteria CNR*MTF > 5 %; MTF > 5 %; CNR > 0.5. ⁴⁾ TXI = true X-ray intensity – controls real output dose for constant intensity. ⁵⁾ Referring to VDI / VDE 2630 part 1.3. Measured as deviation of sphere distance in tomographic static mode (TS) with std. circular scan. Values valid only for FF20 CT Metrology under compliance with conditions described.

More details on request.

Worldwide offices.

Germany – Headquarters

Comet Yxlon GmbH
Essener Bogen 15
22419 Hamburg
Germany
T. +49 40 527 290
E-mail: yxlon@comet.tech
<https://yxlon.comet.tech>

USA

Comet Technologies USA, Inc.
100 Trap Falls Road Ext
Shelton, CT 06484
USA
T. +1 234 284 7849
E-mail: yxlon.us@comet.tech

China

Comet Mechanical Equipment
(Shanghai) Co., Ltd
Block B, 1F No.2, Lane 777
West Guangzhong Road,
Jingan District
200072 Shanghai, PRC
China
T. +86 21 36696906
E-mail: yxlon.cn@comet.tech

Japan

Comet Technologies Japan KK
New Stage Yokohama Bldg.
1st Floor
1-1-32 Shinurashima-cho
Kanagawa-ku
221-0031 Yokohama
Japan
T. +81 45 450 1730
E-mail: yxlon.jp@comet.tech

Korea

Comet Technologies Korea Co., Ltd.
Suwon Venture Plaza Bldg.
48, Samsung-ro,
168 beon-gil Yeongtong-gu
Suwon-si, Gyeonggi-do
Korea (South) 16676
T. +82 (0)70 4337 2780
E-mail: yxlon.kr@comet.tech

Taiwan

Comet Technologies Taiwan Ltd.
1st Floor, No. 120, Guangming Rd.
Qionglin Township
Hsinchu County 307001
Taiwan
T. +886 35922398
E-mail: yxlon.tw@comet.tech