Green Innovation for The Next Generation
The Dental Pioneer, VATECH

VATECH has been leading the dental X-ray trend by introducing world’s first technologies since 2005; 3 in 1 Digital X-ray system, Auto-Switching, One Shot Ceph, Green CT and the Soft Sensor. VATECH’s in house vertical integration of critical components allows higher quality of products, increased pace of innovation and ultimately greater value to the customer. Now we are introducing the new Green technology for the next generation.
Beyond Green CT

Human-oriented innovation
For the next generation.

Time for a change  GREEN 16

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Green 16 in numbers

Vatech has developed many technologies that challenge the stereotypes of dental radiography. It has always been believed that low radiation comes with inferior image quality. However, Green CT™ has successfully been providing clinically diagnosable X-ray scans at low X-ray dose and it is reinforced by Green 16, the 2nd generation of Green CT™.
What makes **GREEN**?

Green technology is not made easily. It is a combination of modern technologies.

If one of the three factors is missing, it is difficult to say that a CBCT is Green.

Since the introduction of the 1st generation of Green, VATECH has been developing the next generation of Green CT and has accumulated studies and datasets for new development. The new achievement, Green 16, is the result of the continuous R&D activities.

Source: FDA 510K approval document

<table>
<thead>
<tr>
<th>Age Group (Years)</th>
<th>Multiplication Factor for Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;10</td>
<td>X 3</td>
</tr>
<tr>
<td>10-20</td>
<td>X 2</td>
</tr>
<tr>
<td>20-30</td>
<td>X 1.5</td>
</tr>
<tr>
<td>30-50</td>
<td>X 0.5</td>
</tr>
<tr>
<td>50-80</td>
<td>X 0.3</td>
</tr>
<tr>
<td>80+</td>
<td>Negligible Risk</td>
</tr>
</tbody>
</table>

Source: Radiation Protection N· 172 by European Commission
Safe for Children, Safe for All
30% Lower Radiation

What has been developed at VATECH breaks many conventions in dental radiography. It was always believed that with low radiation comes inferior image quality, which renders it useless in clinical diagnosis.

However, Green16 provides clinically diagnosable X-ray scans at a low X-ray dosage. With low dose X-ray radiography, achieving clinically diagnosable image quality is the new golden-standard.

**Green 16 reduced radiation by 30% more than the low dose PaX-i3D Green.**
Children are active
1.9 sec ceph would be the best option

Transient attention is a short-term response to a stimulus that temporarily attracts/distracts attention. Researchers disagree on the exact amount of human transient attention span; some say it may be as short as “8 seconds”

Even for adults, it is not easy to stand still when paying attention to one thing for 8 seconds. This means that it is almost impossible for children to be focused without movement during 12 seconds of Cephalometric scanning time. The shortest 1.9 sec ceph scanning time always reduces the movement of children as well as adults.
Children are our top priority
4.9 sec CBCT would be the best option

Everyone knows CBCT has become essential for diagnosis.
What about in Pediatric?

- Ectopic eruption
- Trauma surgery
- Supernumerary teeth

* Source: Survey result from IAPD (International Association of Pediatric Dentistry)

Children can’t hold themselves still for a long time. This results in a blurry image.
What about 4.9 sec CBCT Scan?

24.5 sec vs 4.9 sec

Devoting ourselves to human health care, VATECH goes forward from Green to Green16 with minimum radiation based on shortest CBCT scan time.
Regular check-ups are crucial for dental health

6.1 sec Pano would be the best option

How much patience does a child have?

Is it be possible for a child with a toothache to hold still during a 10-12 sec pano scan time?

Green 16 has a pano mode which is specially designed for children’s safety with 6.1 sec scanning time.
Green 16 utilizes a 49.5 μm high resolution CMOS X-ray sensor. It is the smallest pixel/high resolution dynamic X-ray sensor for CBCT currently available on the market.

For X-ray sensors, such a small pixel requires consistent, precise manufacturing, even a single defect at a microscopic level can render the entire imaging array defective. For most manufacturers this has proven to be cost prohibitive and continues to be; unless the precision in manufacturing will advance to make this a reality.

<table>
<thead>
<tr>
<th>Sensor pixel (um)</th>
<th>Green 16</th>
<th>A Company</th>
<th>B Company</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>49.5</td>
<td>127</td>
<td>100</td>
</tr>
</tbody>
</table>

*Native (non-binning mode) pixel size

High Performance X-ray Sensor

- Ultra Fine Resolution (Pixel pitch: 49.5 μm)
- High Sensitivity
Quality images are essential for your investment

Iterative Reconstruction for high quality image

When baking, bakers always sift flour to make the texture more delicate in the finished product. If a baker repeats sifting flour, the bread can have an exceptionally finer texture, and will reduce any clumps of flour in the batter.

Likewise, VATECH developed the advanced dental image reconstruction algorithm to provide better quality dental images. VATECH replaced the conventional dental reconstruction algorithm with the reconstruction algorithm used in medical industry. *It repeats the reconstruction process 10 times* and it produces a high quality image as the result. Under the same exposure condition, the image reconstructed using this method has significantly better image quality with reduced noise and better contrast resolution.
Quality image is essential for your investment

Green16 utilizes CMOS X-ray sensor

CMOS sensors are easy to readout at high speed which minimizes ghosting on the images. TFT sensors on the other hand perform poorly with high speed readouts, so they are more suitable for one-shot images.

CMOS sensors read data 10 times faster than TFT sensors so the sensor has minimal motion artifacts. However, TFT sensors have a poor data refresh rate so they are prone to motion artifacts such as ghosting and image lag.

- Higher readout speed & Minimized ghosting on the images
- Faster CT scanning
- Higher electrical charge mobility & Lower noise
Intellectual Diagnosis for All

- Implant (5x5~12x9)
- Endo (5x5)
- Sinus (12x9)
- TMJ (16x9)
- Airway (12x9)
- Model Scan (8x9)
Easy and Quick Dental 3D Imaging Software Ez3D-i

Professional Consultation
- Over 200 consultation videos
- Creation of personalized consultation material

Implant Simulation
- 3 Click Implant Simulation
- Collision Detection
- Bone Density
- 3D Panorama
- Oblique

Various VR Coloring modes
- Teeth Mode
- Bone Mode
- Soft-Tissue Bone Mode
- MIP Mode
- Soft-Tissue Mode

Quick & Accurate Cross-Section
- 8 Multi-Section (Curve) Management
- One-Click Cross Section (3D PAN tab)
- Canal Drawing

Accurate diagnosis through clear VR and easy consultation using intuitive 3D images

Easy and Quick 3D Dental Imaging Software

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Are you trained well enough to use 3D?

Have you already purchased a CBCT? It may be installed properly and you and your staff learned how to use it. But what about the 3D software? Have you ever felt like your software is too much? What if your 3D software is like a dashboard of an airplane?

The value of CBCT is not just in the hardware, but is mainly in 3D software. The important thing is how well you can use it. But as mentioned above, if the 3D software has too many functions like instrument panel of airplane, you are likely to use only 10% of all functionality that it provides. This means you are only using 10% of the software's value and not making the most out of your investment.

Stressful software to deal with everyday
Are you trained well enough to use 3D?

There are some advanced features that you must do that are barriers to using CBCT properly.

- Orienting all axes; Axial, Sagittal, Coronal
- Drawing panoramic curve for every case
- Dealing with too many buttons and functions

To make the most of your investment, you need to be familiar with 3D and use it freely to expand your practice. However, the above steps can hinder you from reaching success. Since you never had the chance to learn 3D software before even though you purchased a CBCT, this will result in a low return on your investment.
Take the easy way and make everything simple.

What if you no longer needed to do these difficult steps?

- Orienting all axes: Axial, Sagittal, Coronal
- Drawing panoramic curve every case
- Dealing with too many buttons and functions

One-Click Sectioning

How does One-Click sectioning influence you?

<table>
<thead>
<tr>
<th>(Stress free) Easy to operate</th>
<th>Time Saving</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-second sectioning is possible because Ez3D-i provides volume panoramic image. Without getting stressed out, you can operate and utilize 3D in any case.</td>
<td>Complicated steps for diagnostic planning can be done within a few seconds. It dramatically saves you time to see more patients and makes it easy for your staff to learn as well.</td>
</tr>
</tbody>
</table>
Green Innovation for The Next Generation

5 seconds is enough to get sectional images of your region of interest.

The fundamental reason that makes 3D software difficult to learn is that it is running on a 2D operating system. If you have a conventional 3D viewer, you are still required to operate complicated Axial, Sagittal, Coronal images when you need to get to the region of interest. With One-Click sectioning of Ez3D-i you can save time dramatically.

More than 60 seconds

Less than 5 seconds

VS.

Step 1. Adjusting Axes
Step 2. Finding R.O.I
Step 3. Drawing panoramic curve
Step 4. Sectional images

One Click Sectioning

www.vatechglobal.com
5 seconds is enough to get sectional images of your region of interest.

VS.
Spend less time for treatment planning

What about the implant simulation process?

Find R.O.I in Axial/Panoramic image with scrolling

Click Panoramic curve button

Draw Panoramic curve

To make right angle, rotate the Sagittal image

Go to the [Implant] module

Scroll down the bar to find R.O.I

Measure the length

Open the implant library

Select implant

Place implant

Reposition implant

Position Navigation Window

Measure Length

Insert Implant

VS.

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Implants

What kinds of ROI would you like to explore in your practice?

- **FOV 5x5**
  - Simple implant

- **FOV 8x9**
  - Multi implants
  - Surgical guides (Partial)
  - Complex extractions
  - Bone grafting

- **FOV 12x9**
  - Multi implants
  - Surgical guides
  - 3rd Molar extractions
  - Sinus lifts for both sinuses

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**Ez3D-i V.4.1**

Better Implant treatment planning

**Canal Warning**
Get real time virtual feedback, risk assessment before treatment

**Sliced View**
Accurate positioning within 2D slice images

**Bone Density**
Examine the bone quality at the implant site

**STL file Import**
STL file can be imported and be merged with CBCT data
Endo

What kinds of ROI would you like to explore in your practice?

You only need FOV 5x5?
Many endodontists start placing implants

Endodontists who place implants are expected to grow from 7% to 17%.
The tendency for practitioners to do both endo & implant treatments will lead them to 5x5 FOV and even 8x9 FOV for multiple implants.

FOV 5x5
FOV 8x9

Ez3D-i V.4.1 Convenient Analysis for Root formation

Oblique

- After clicking Oblique on MPR tab, ROI can be verified quickly by rotating the axis 360 degrees.
Sinus

What kinds of ROI would you like to explore in your practice?

Sinus Analysis

The maxillary sinus can limit the amount of bone height for an implant placement. With a sinus lift, bone can be grafted under the sinus membrane to increase the height of bone. Highly accurate 3D images could help the accurate positioning of implant fixtures in sinus area. Precision is critical to avoid anatomical landmarks which can result in injury to the patient.

Sinusitis include: thick nasal mucous, a plugged nose, and pain in the face. For those chronic cases, using a CBCT is recommended for definite diagnosis.

Reference: CBCT and implants, Edward J. Mills, DDS
https://en.wikipedia.org/wiki/Sinusitis

Ez3D-i V.4.1

Sinus Analysis by Volume Measurement

Verify ROI quickly
- Oblique function
- measure sinus volume
- Implant insertion in upper side(tooth #35).
TMJ

What kinds of ROI would you like to explore in your practice?

TMJ Analysis

TMD (TemporoMandibular joint Disorder) can cause pain in the jaw joint of your patients. It can be caused by trauma such as grinding the teeth (bruxism) and clenching. These habits can change the alignment of teeth and cause the pain in the TMJ and facial muscles when chewing.

In order to treat pain in the TMJ, a CBCT image may be taken of the mouth and jaw, showing the location of the TMJ disc so the doctors have a better idea for proper treatment.

❖ Reference: Temporomandibular Joint (TMJ) Syndrome, Steven S. Bhimji, MD, MSc, PhD, 2015

Ez3D-i V.4.1 Simultaneous Analysis for both TMJ

Clipping
- Analyze TMJ by clipping 3D Image

TMJ Navigator (FOV 12x9, 16x9)
- Select the TMJ area to check the cross section

Segment TMJ (FOV 8x9, 12x9)
- Separate condyle or fossa to diagnose TMJ accurately
Airway

What kinds of ROI would you like to explore in your practice?

Airway Analysis

“Treatment for Sleep Apnea, became an additional source of income in dental clinics”

Nowadays, the use of CBCT is common to measure the airway volume. According to the European Journal of Orthodontics, the measurements of the airway volume using CBCT are reliable and accurate.

Sleep apnea patients have considerable differences such as size and position of the mandible, airway space, size of the tongue and the soft palate compared to patients without sleep apnea, making measurement of the airway volume necessary.


Ez3D-i V.4.1

A powerful function for Airway Volume Analysis

Simple Airway Selection
• Select the airway area by clicking the mouse only twice

Automatic Airway Volume Measurement
• Measure total airway volume and show with color code
• Calculate the value of total and minimum airway volume
Model Scan

Digitized One-Stop Clinic

- Save up to 80% for making a surgical guide
  - Self-production up to $50 vs. outsourcing production from $300 to $700

- Shorten the process to one day
  - Outsourcing production: from 7-10 days vs. Self-production: one day

Digitized One-Stop Clinic

STL Data

- Store plasters as digital models for ease of management
- Sufficient level of detail for surgical guide design

Specially designed Jig

- Stable protection from partial model to full model
Green Innovation technology will help dentists to provide “Satisfaction” for the patients.
You are now entering

“A Stress FREE” zone

**Improve the accuracy with ART-V**

- Clear images give you less stress and more confidence
- Leads to accurate diagnosis for implant planning
- No extra discomfort to create surgical guide

**Streamlined Workflow**

- ART-V Solution automatically activates the function according to patients’ dental conditions

**Metal artifacts may hinder visualization and reduces diagnostic confidence**

※ ART-V : Artifact Reduction Technology of VATECH
The “Magic” Pan

Pick up the clearest area from 21 layers

- It is acquired through the elimination of distorted and blurred images caused by improper patient positioning.
- Focused partial images are reorganized throughout the whole dental arch and the image quality is improved.
- The image becomes clearer especially in the incisor, canine, TMJ areas and root canal area.

MAGIC PAN creates a more superb panorama image.
Your smart tutorial, EzSmart

EzSmart supports Vatech’s customers in securing the optimized image at all times for better diagnosis.

EzSmart is a solution which analyzes the acquired images and provides feedback on them.

1. Equipped with Image analyzes Tool for Optimized Images At All Times!
   Analyze the panoramic and cephalometric images automatically and provides feedback with analyzed result.

2. Supports Self-diagnosis & Self-training for the Operator!
   By checking the analyzed results statistics, it is able to utilize them in diagnosing of an operator’s positioning habit. In addition, EzSmart supports self-training for accurate patient positioning with embedded video guides.
## Specifications [Green16 : PHT-65LHS]

<table>
<thead>
<tr>
<th>Function</th>
<th>CT + Pano + Ceph + ModelScan</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Focal Spot Size</strong></td>
<td>0.5 mm (IEC60336)</td>
</tr>
<tr>
<td><strong>CT FOV Size</strong></td>
<td>16x9 / 12x9 / 8x9 / 5x5</td>
</tr>
<tr>
<td><strong>Voxel Size (mm)</strong></td>
<td></td>
</tr>
<tr>
<td>16x9</td>
<td>0.2 / 0.3</td>
</tr>
<tr>
<td>12x9</td>
<td>0.2 / 0.3</td>
</tr>
<tr>
<td>8x9</td>
<td>0.12 / 0.2</td>
</tr>
<tr>
<td>5x5</td>
<td>0.08 / 0.12</td>
</tr>
<tr>
<td><strong>Scan Time (sec)</strong></td>
<td></td>
</tr>
<tr>
<td>Pano</td>
<td>14.1 / 7.0 (Optional with Magic PAN)</td>
</tr>
<tr>
<td>Ceph</td>
<td>3.9 / 1.9</td>
</tr>
<tr>
<td>CBCT</td>
<td>9.0 (16x9 ~ 12x9) / 4.9 (5x5~8x9)</td>
</tr>
<tr>
<td><strong>Gray Scale</strong></td>
<td>14 Bit</td>
</tr>
<tr>
<td><strong>Tube Voltage / Current</strong></td>
<td>60 - 99 kVp / 4 ~ 16 mA</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td></td>
</tr>
<tr>
<td>Without CEPH unit</td>
<td>134 kg (295.4 lbs - without the Base)</td>
</tr>
<tr>
<td></td>
<td>187kg (412.3 lbs – with the Base)</td>
</tr>
<tr>
<td>With CEPH unit</td>
<td>159 kg (350.5 lbs - without the Base)</td>
</tr>
<tr>
<td></td>
<td>212 kg (467.4 lbs - with the Base)</td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td></td>
</tr>
<tr>
<td>Without CEPH unit</td>
<td>1125 mm (L) x 1488.7 mm (W) x 2304 mm (H)</td>
</tr>
<tr>
<td>With CEPH unit</td>
<td>1874.1 mm (L) x 1488.7 mm (W) x 2335.5 mm (H)</td>
</tr>
</tbody>
</table>

* The specifications are subject to change without prior notice.
What’s NEXT?