dental wings

About Dental Wings

Dental Wings is a leading provider of dental CAD / CAM solutions. The company is specialized in the development of 3D scanners and CAD software dedicated to different dental market segments. DWOS, Dental Wings' proprietary Digital Dentistry Platform, improves the design and manufacture of dental prostheses. Dental laboratories enjoy the flexibility of performing designs on models scanned in-house or on intra-oral or impression scans received directly from dentists. Similarly, restorations can be manufactured in-house or outsourced to an increasing number of production centers.

Dental Wings is a Canadian based company whose headquarters and main development and manufacturing activities are located in Montreal – Quebec. For more information regarding Dental Wings please visit us at **www.dwos.com**

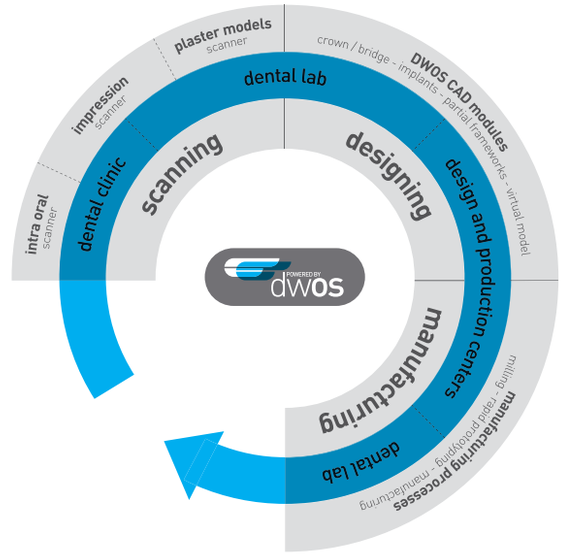
DWOS™ Dental Wings' Digital Dentistry Platform

DWOS represents the cornerstone of Dental Wings' strategy to offer the dental market the most advanced Product Life-Cycle Management (PLM) System. **DWOS** is built on a robust proprietary platform, which has been specifically designed for managing products and their related work flows on a distributed architecture.

DWOS is the most flexible and versatile dental CAD / CAM solution on the market. Its deployment is easy and can be adapted to respond to business objectives and operating needs of small, medium and large laboratories. Laboratories which have integrated **DWOS** in their daily operations have gained in productivity, improved the quality of their products and increased the reliability of their processes.

The **DWOS** platform has established new standards for the dental market in terms of technology integration. Thanks to its open and robust architecture, **DWOS** is today's most comprehensive open CAD / CAM solution on the market. Better yet, **DWOS** is continuously evolving through development partnerships with leading manufacturers.

DWOS is based on an open architecture and integrates the best available i) 3D Scanners, ii) Design software and iii) Manufacturing solutions into one common platform.



3D Scanners

The following 3D scanning technologies have been integrated or made compatible with DWOS:

Intra-oral scanners: iTero™ (Cadent), FastScan™ Digital Impression System (IOS technologies)

Impression scanner: iSeries™ (Dental Wings)

Model scanners: 3Series™ and 5Series™ (Dental Wings) as well as any other 3D open scanner with an STL output.

DWOS Software Modules

DWOS provides the following proprietary software modules:

- Crown & Bridge (DWOS - CNB)
- Implants (DWOS - IMP)
- Rapid prototyping & manufacturing (DWOS – RPM)
- CAM (DWOS – CAM)
- Virtual model design (DWOS – VMD)

Manufacturing Solutions

The following manufacturing processes have been integrated or made compatible with DWOS:

Milling: ZenoTec™ T1, 2100, 4030 M1 (Wieland), Katana™ (Noritake), Prismatic CZ™ (Glidewell), Yenadent

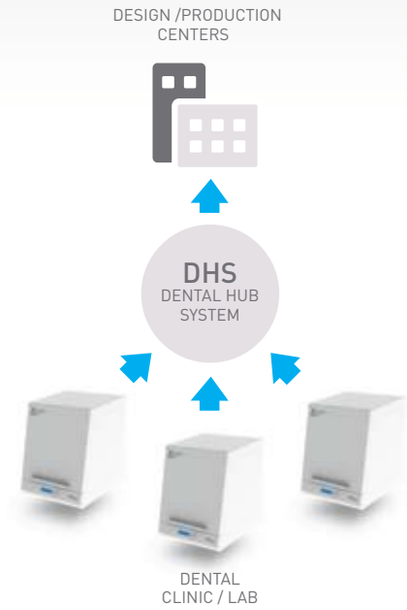
Rapid Protyotyping: Perfactory® Series (Envisiontec), T612, D76 (SolidScape), ProJet™ DP 3000 (3D Systems)

Rapid Manufacturing: PM 100 T Dental (Phenix Systems), EOSINT M 270 (EOS), Imagen™ (Ex-One Company)

DHS™ Managing the outsourcing seamlessly

The DHS is the communication backbone of DWOS. In a seamless manner, it connects the clinical to the manufacturing environment. The DHS communicates and transfers data from any process step to another in a flexible and secure manner. In each process step of the prosthesis life-cycle, dentists and dental technicians have the choice to perform the job internally or to outsource it using the DHS.

Scanning data originating from intra-oral, impressions, or models scanners can be transferred to the DWOS design center in order to perform design work remotely. Similarly the design data originating from DWOS design modules can be transferred to DWOS registered production centers in order to outsource the manufacturing of i) models, ii) design frameworks, iii) full contours, iv) implant custom abutments, etc.



When productivity, quality and versatility matters

DWOS delivers to its laboratory partners:

- An open solution, accessible to all and without any restrictions and limitations.
- Secure integration to a wide range of qualified scanning, designing and manufacturing solutions.
- An easy worldwide access to design and manufacturing centers.
- A digital platform in full compliance with ISO quality standards.
- A CAD / CAM solution in constant evolution, making DWOS users immune from obsolescence.

5 SERIES

3D Scanners

dwos.com

Description

The **5Series** is a non-contact optical 3D scanning device. The system, with its proven laser triangulation combined to five axis of freedom is very versatile and provides accurate measurements on a very large scanning volume (140 mm x 140 mm x 100 mm).

The **5Series** is intuitive and is easy to use. The standard output format is STL. However other file formats are available upon request.

The **5Series** is recommended for medium to large sized laboratories, where productivity and versatility are a must. The **5Series** is our scanner flagship. Our development team continues to add new applications and features.

Applications

- Model scanning from single unit to full arch.
- Full arch scanning with palate for partial frameworks
- Multi-die scanning & designing capabilities (16 copings scanned & designed simultaneously in 20 min).
- Scanning occlusion using check-bites or on positive models using our patented *"axis-finder"* technique
- Impression scanning up to full arch
- Replication of wax-ups
- Scanning implants for custom abutments

Benefits

Accuracy and Productivity

The operating principles of the 5Series are based on the parallelizing of various tasks required to generate an accurate scan. The computation and post-processing are executed in the background in hidden time. The user can continue his design work while the scanner is performing other tasks. Using the 5Series with our Crown & Bridge software design module, laboratories can achieve the following scan and design times:

- Scanning and designing simple copings using the multi-die batch mode in about 1 min 15 sec
- Scanning and designing full contour crown, using the *"axis finder"* in less than 7 min
- Scanning and designing 3 units bridge framework in less than 10 min

Versatility

The 5Series is a general purpose laboratory 3D scanner and is able to perform most applications and clinical cases encountered in the daily operation of a dental laboratory. The scanning volume is very large and allows the users to scan articulated models. The five axis of freedom provides better accessibility which allows accurate measurements on impressions and wax-ups.

Fully integrated to DWOS / DHS

The 5Series STL output is fully and seamlessly integrated to DWOS design software modules. Also, both scans and designs can be dispatched to design / production centers using DHS.

Fig.1 Full arch scan

Fig.2 Full arch scan with antagonist on positive model

Fig.3 Full arch scan in occlusion

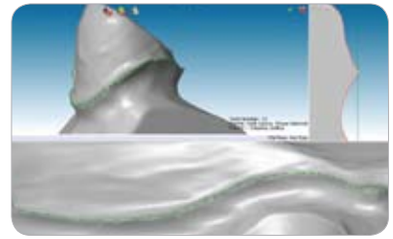


Fig.4 Margin edition

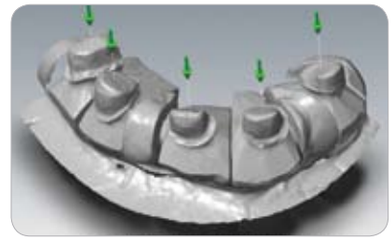


Fig.5 Insertion axis validation

Fig.6 16 Dies on multi-die plate

Specifications

The 5Series is delivered in its standard version with the following components:

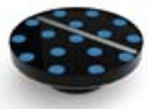
1 a five axis scanner

2 a calibration tool kit

3 a kernel server application to access different DWOS modules

4 a model holder for scanning plaster preparations and implants

5 a multi-die plate holder for scanning & designing up to 16 dies in one session



6 an impression holder to scan silicone and alginate-based check bites and replicates wax-ups

7 an *"axis finder"* holder to scan occlusions on positive models

Scanning specifications

- Plaster, silicone or alginates
- Scanning volume: 140mm x 140mm x 95mm
- Accuracy: < 20 microns
- Scan points: single dies > 100,000 points
  full arch > 1,000,000 points
- Simultaneous scan and design

Mechanical / Electrical

- Foot print (W x D x H): 47 cm x 47 cm x 40 cm
- Weight of the scanner: 33 kg
- Voltage: 110 / 220 volts

3 SERIES

3D Scanners

dwos.com

Description

The **3Series** is a non-contact optical 3D scanning device. The system combines proven laser triangulation to three axis of freedom. The system is very versatile and provides accurate measurements on a scanning volume of 90 mm x 90 mm x 90 mm.

The **3Series** is intuitive and is very easy to use. The standard output format is STL. However, other file formats are available upon request.

The **3Series** is our entry level scanner and is recommended for small and medium sized laboratories. This scanner is particularly interesting for laboratories wich desire a phased entry into CAD / CAM.

Applications

- Model scanning from single unit to full arch.
- Full arch scanning with palate for partial frameworks.
- Multi-die scanning & designing capabilities (6 copings scanned & designed simultaneously in 10 min).
- Scanning occlusion using check-bites or on positive models using our patented *"axis-finder"* technique.
- Scanning implants for custom abutments.

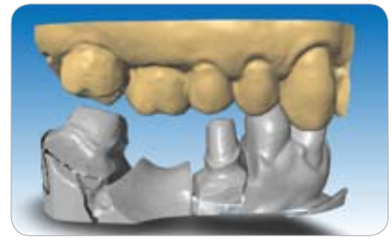


Fig.1 3 Units bridge using axis finder

Fig.2 Model scan ready for partial design

Fig.3 Full arch scan

Fig.4 Lower jaw scan with wax-up

Benefits

Simplicity and ease of use

With its powerful embedded computer, the 3Series has been engineered for a plug and play deployment. Combined with DWOS design software modules, the 3Series represents a unique opportunity for laboratories, in terms of cost and capabilities, to control their designs and outsource their production using DHS services.

Specifications

The 3Series is delivered in its standard version with the following components:

1 a three axis scanner

2 a calibration tool kit

3 a simple kernel server application

4 an embedded PC (quad core Q8200, 2.33 gHz frequency, 4Gb RAM, 500 Gb, 7200 rpm hard disk)

5 a model holder for scanning plaster preparation and implants *(optional)*

6 a multi-die plate holder for scanning & designing up to 6 dies in one session *(optional)*

7 *"axis finder"* holder to scan occlusions on positive models *(optional)*

Scanning specifications

- Plaster material
- Scanning volume:90 mm x 90 mm x 90 mm
- Accuracy: < 20 microns
- Scan points: single dies > 100,000 points
  full arch > 1,000,000 points
- Simultaneous scan and design

Mechanical / Electrical

- Foot print (W x D x H): 33 cm x 39 cm x 41 cm
- Weight of the scanner: 20 kg
- Voltage: 110 / 220 volts

SERIES

3D Scanners

dwos.com

Description

The iSeries scanner is a non-contact optical scanner specifically designed to scan and digitize silicone or alginate-based impressions for the prosthetic and the orthodontic markets. The operating principles of the iSeries were optimized to take into account the various constraints which are generally encountered in scanning impressions:

Negative shape constraints

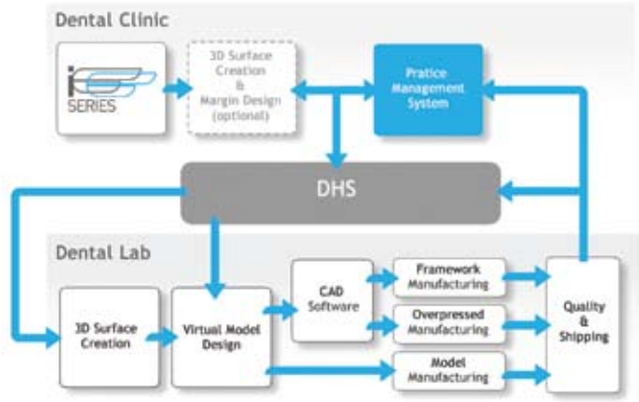
Accurate measurements with wide access to most clinical cases including deep and narrow shape impressions (e.g lower anteriors) are achieved with the iSeries by placing two cameras at different angles. The first camera having a wider inclination to the laser measures, the global clinical case and the shallow region of the impression. The second camera with a smaller inclination measures the deepest and narrowest part of the impression. The global 3D scan is generated by combining the scan data from each camera. In addition, the iSeries includes 5 axis of freedom which optimize the orientation of the impressions with respect to the optical axis.

Impression materials constraints

The application of a very thin optical coating may be required, in order to have an uniform optical response from the wide variety of impression materials currently used in dental clinics.

Applications

The iSeries scanner functionalities were optimized to operate within a dental clinic. The preferred configuration is to interface and drive the scanner from the practice management system of the dental office. The system operates with minimum intervention and the acquired scans can be programmed to be transferred seamlessly to the dental lab of choice.



The iSeries scanner applications are as follows:

- Scanning impressions from single preparation to full arch
- Replication of wax-ups

Benefits

The iSeries scanner will generate accurate digital scans ready for electronical transfer to laboratories. The benefits are:

More accurate clinical information

Scanning the impressions in the dental office minimizes the alteration of the impression materials during shipping. The accuracy of the process is also improved by eliminating the traditional labor intensive plaster model production.

Reduced turn-around time

The turn-around time is reduced by at least 24 hours by eliminating the shipping of impressions. Furthermore, laboratories can start their design process in parallel, while the model is being manufactured.

Elimination of shipping costs

No need to pay for collecting and delivering impressions to the laboratories.

Eliminate ultimately the manufacturing of the physical model

Eventually, the manufacture of physical models mainly for single crowns becomes unnecessary.

Fig.1 Negative scan

Fig.2 Cleaned & reconstructed positive model

Fig.3 Negative lower jaw on alginate

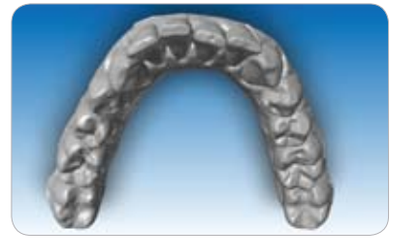


Fig.4 Positive model on lower jaw

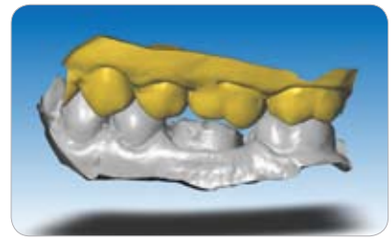


Fig.5 Single molar with occlusion using axis finder

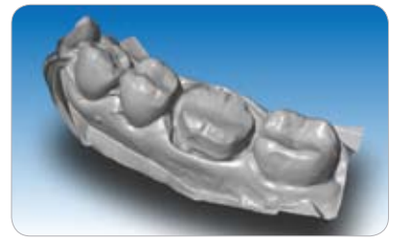


Fig.6 Single molar with adjacents

Specifications

The iSeries is delivered in its standard version with the following components:

1. a five axis scanner
2. a calibration tool kit
3. a simple kernel server application
4. an embedded PC (quad core Q8200, 2.33 gHz frequency, 4Gb RAM, 500 Gb, 7200 rpm hard disk)

Mechanical / Electrical

- Foot print (W x D x H): 33 cm x 39 cm x 41 cm
- Weight of the scanner: 20 kg
- Voltage: 110 / 220 volts

Scanning specifications

- Silicone or alginates
- Scanning volume: 90 mm x 90 mm x 90 mm
- Accuracy: < 20 microns
- Scan points: > 1,000,000 points

DWOS SOFTWARE

Prostheses Design

dwos.com

Thanks to the deep roots of our development team in dental CAD / CAM, **DWOS** design modules are the most comprehensive and intuitive software solutions for designing dental restorations. Dental technicians grasp the **DWOS** design concept quickly and are in full control of their design work.

DWOS design modules are fully integrated to our 3 and 5 axis Series scanners. Such powerful combinations deliver higher productivity than any other existing solutions on the market. By parallelizing the scan and design processes, we can define the margin lines on initial scans, while the 3D scanner is continuing its job.

Built on a completely open platform, users are always free to import from other scanning technologies into **DWOS**, to perform their designs. Our laboratories equipped with **DWOS** design software modules were among the first to perform their restoration designs from chair-side intra-oral scans generated by iTero™ (Cadent).

DWOS has adopted an *"outside to inside"* design strategy. This approach enables the laboratories to design full contour by taking into account the full clinical situation in one design step. The design module computes and delivers full anatomies. The frameworks designs are dynamically adjusted to the full prostheses morphology to allow for optimum porcelain support. **DWOS** design software includes: i) the crown & bridge, and ii) the implants modules.

DWOS - CNB - Crown & Bridge Module Features

Fig.1 Order management - Database overview

Fig.2 Editing coping parameters

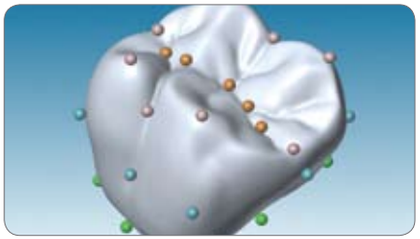


Fig.3 Customizable anatomy library

Fig.4 Insertion axis modification in CAD

Fig.5 13 Units bridge with full restorations

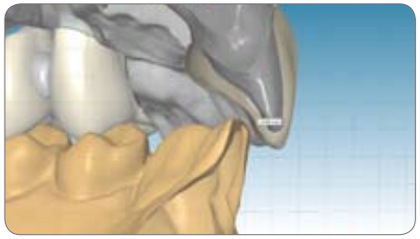


Fig.6 Cross section on anterior with space measuring

Fig.7 Posterior bridge & anterior with opposing

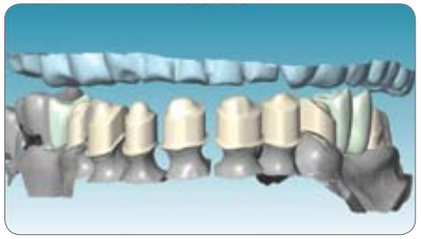


Fig.8 Telescopic units

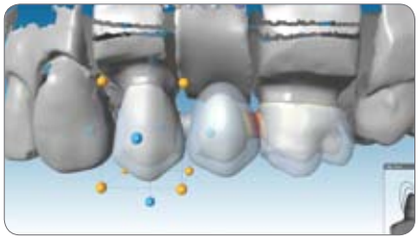


Fig.9 Anatomy & framework simultaneous editing

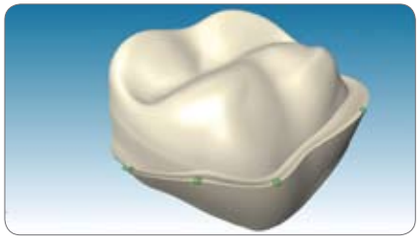


Fig.10 Dental band creation

Fig.11 Bridge with partial crown build-up

Fig.12 Overpressed on coping

DWOS - IMP - Implant Module Features

Fig.1 Implant kit creation

Fig.2 Single custom abutment

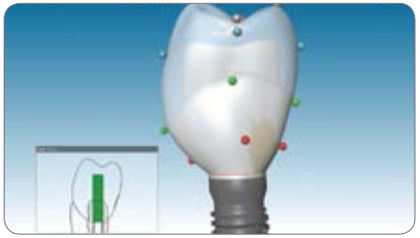


Fig.3 Gingival area edition

Fig.4 Abutment & coping & press-over

DWOS SOFTWARE

Manufacturing

dwos.com

The manufacturing software modules of **DWOS** represent the main interface between the design and production environments. They greatly facilitate the automation of several tasks that are usually performed manually. The **DWOS** Manufacturing software includes three separate modules: i) DWOS – RPM, ii) DWOS – CAM and iii) DWOS – VMD.

DWOS - RPM (Rapid Prototyping and Manufacturing)

The RPM module provides the fastest path to rapid-prototype frameworks, full contours and models. It provides automatic generation of supports and identification tags. The files are positioned with an optimum orientation in the allocated nesting space to maximize the number of cases and minimize the printing time. The nested plate manufacturing batch file is automatically sent to the RP machine to start the fabrication process.

DWOS - CAM Module

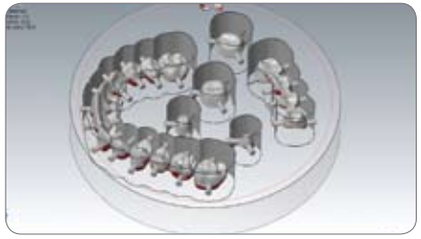
The CAM module is fully integrated to DWOS platform and performs the following tasks:

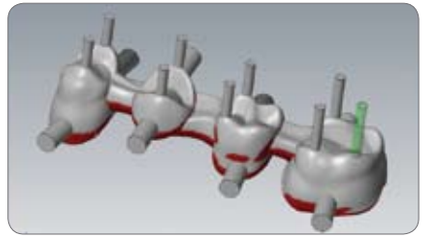
Creation of the nesting blanks:

The users can create their own blanks from cylindrical or cuboid shapes.
A configuration table enables the users to set-up several key parameters:
i) geometrical dimensions of the nesting blanks, ii) security distance of the milling tools to the blank outer dimensions,
iii) automatic generation of milling links and / or sintering stumps:

Nesting design files

The design files which are routed by DWOS to the CAM module are automatically screened with respect to their dimensions. The designed files are dragged to the nesting blank with the milling links and /or sintering stumps generated automatically. A manual editor allows the users to remove or change the orientation of the links and stumps.





Calculation of tool path trajectories:

DWOS - CAM module has integrated a tool-path calculation engine which generates milling trajectories from 3 to 5 axis milling machines. DWOS development team is currently working with material providers and milling machines manufacturers to provide optimal milling strategies for different materials (ZrO2, Titanium, CrCo) and indications (copings, full contour, long span bridge, custom abutments, etc.)

DWOS - VMD (Virtual Model Design)

The VMD module was developed by DWOS software team in response to the increasing level of interest and activities related to the development of intra-oral and impression scanners. The VMD module offers a unique opportunity for laboratories for replacing their current tedious and labor intensive model making process by an automated digital manufacturing process. The end results being the generation of readily articulated models.

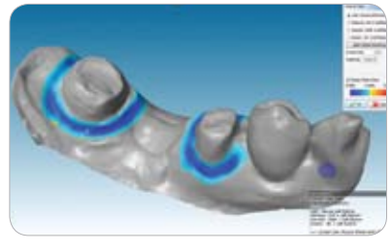


Fig.1 Preparing & Cleaning model

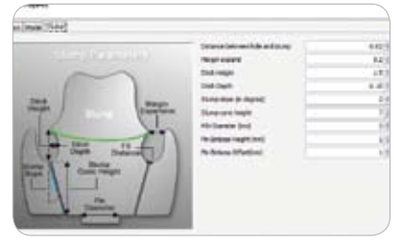


Fig.2 Die ditching parameters

Fig.3 Model & Ditched Dies

Fig.4 Model & Ditched Dies - transparent

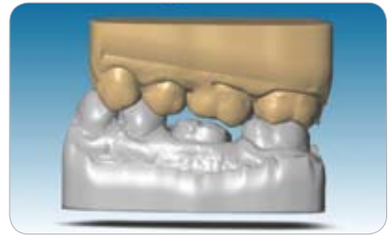


Fig.5 Model & Opposing in occlusion

Fig.6 Model and ditched die