

The Autoscan DS-EX Pro H A Home Run from Shining 3D

By André Gaul, C.D.T.

What was a mostly unknown brand in 2018, at least on the North American Dental landscape, Shining 3D has certainly garnered some well-deserved attention over these past years by delivering stellar products at competitive prices. Late last year, the company unveiled its latest desktop scanner, the



Autoscan DS-EX Pro H, an essentially spruced up iteration in the Autoscan DS-EX Pro range.

What this scanner offers over its predecessors comprises primarily of two 5 MP cameras (formerly 1.3 MP), an increase in accuracy of $\leq 8\mu\text{m}$ (formerly $10\mu\text{m}$), and last but certainly not least, a sleek new carbon grey housing.

Having had positive experiences with both the DS-EX and DS-EX Pro, I looked forward to testing this new offering. While, on paper, the DS-EX Pro H isn't Shining 3D's top of the line desktop scanner, the DS-MIX being the latter, what it delivers at a sub 10000\$ price tag is impressive to say the least. Let's have a look.



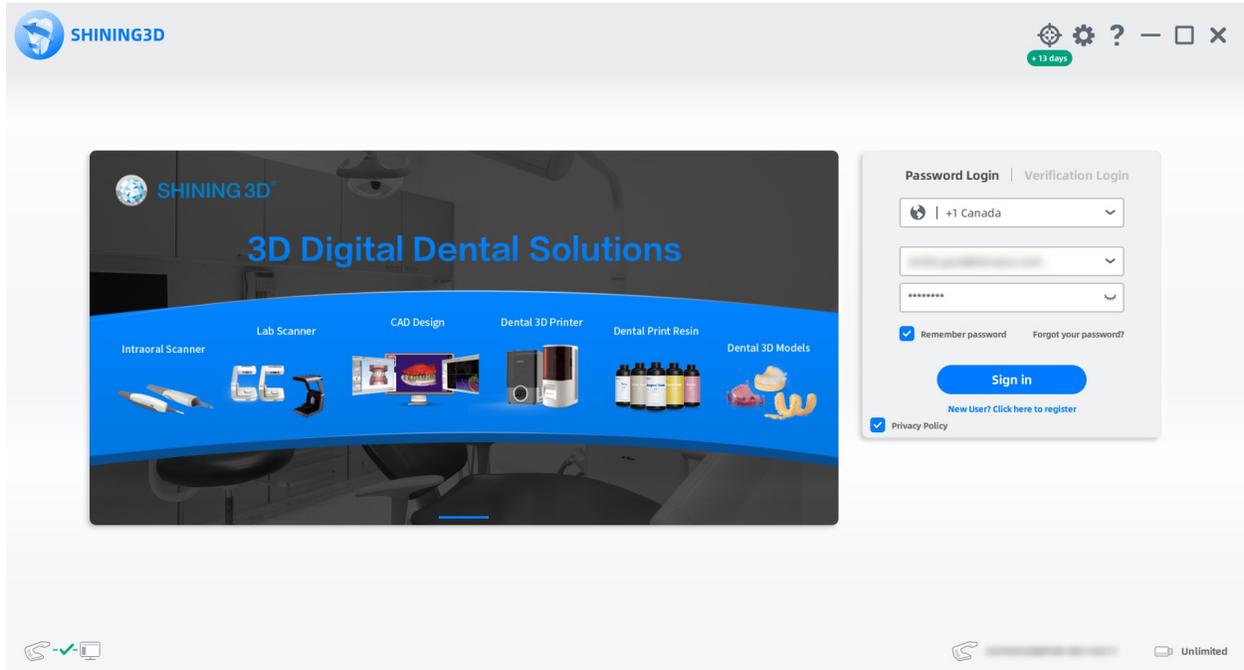
For those not familiar with Shining 3D's Autoscan range of desktop scanners, they are all about efficiency. From their portability and small footprint, to their easy setup, down to their workflow optimized for speed. Like previous iterations of the DS-EX Pro, this version comes with the standard fair of fixtures and adapters for all scanning applications, including the dynamic articulator plate and the All-in-One die plate (not visible in this picture).



The set-up and installation of the software could not be simpler: Connect the scanner to its power source and to an available USB3 port on your desktop or laptop computer. Then, switch on the scanner, launch the software installer and follow a few simple steps.



The software itself, DentalScan, has evolved quite significantly since I first began using it in 2018. Unlike its predecessors, the DS-EX Pro H no longer requires a Sentinel USB dongle to be plugged into the computer in order to use it. Instead, it relies on a personal Shining 3D user account, which you log into when launching the application. Upon the initial launch, you are prompted to do a one-time activation of the detected scanner, after which, you are good to go.



The software was developed and optimized to run on an Intel platform and a discrete Nvidia graphics card (sorry AMD fans). Additionally, I discovered, early on during the course of my evaluation, that some of the newer functions like Multi Path Scanning, AI scan and HD Quality, eat up quite a bit of RAM. On 16GB, with any of those functions enabled, the rendering process would just hang mid-scan indefinitely. With 32GB of RAM, everything ran smoothly and without any hiccups. I also noticed that, while a discrete graphics card is required, the software actually made little use of the video RAM during rendering. What all this means is that while 32GB of RAM is a definite must, at least as of writing this review, you don't need the beefiest graphics card on the market to use this scanner, which is good news considering that RAM has returned to more palatable prices of late while prices of current high-end GPUs remain absurdly high. I myself ran this scanner and software on an older Geforce GTX 1060ti and encountered no problems.

Dental Models

For testing, I gathered a collection of models, both stone and 3D printed, for which I have existing zirconia restorations and cast partial frameworks that fit them perfectly.



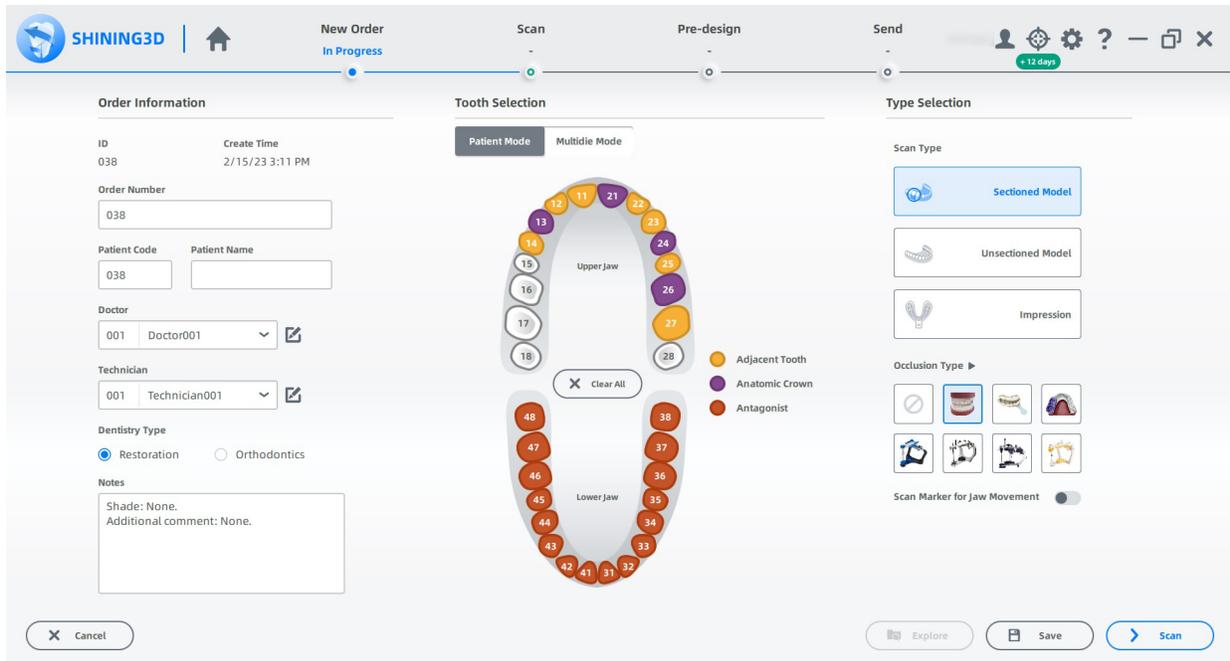
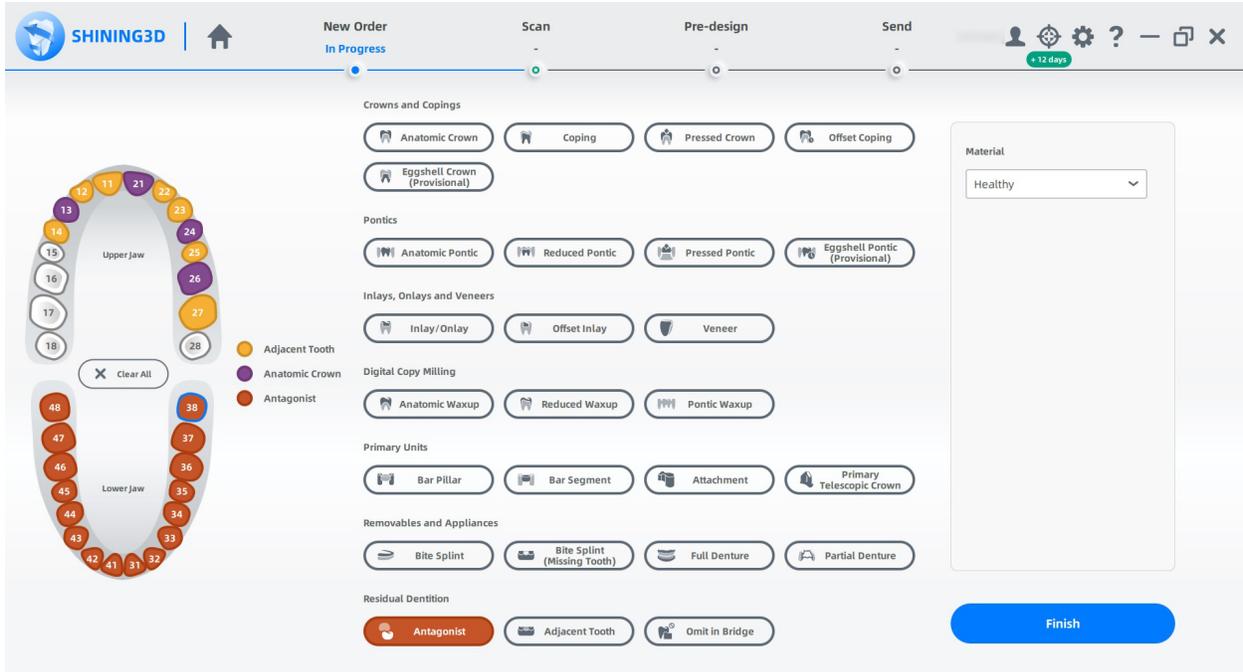
The method would consist of scanning the models, print them out and test fit the restorations and frameworks on them.



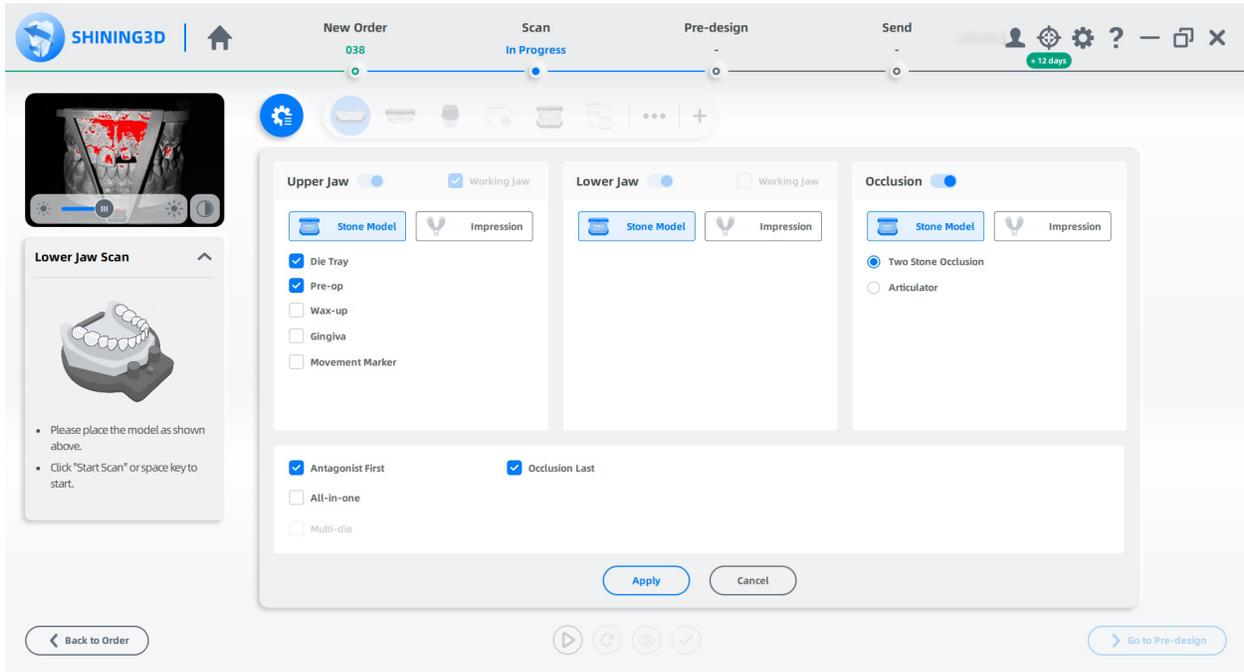


As with any other dental scanner, the workflow starts by creating an order. Dentalscan offers all of the options one would expect from a mature scanner software. From Restorations and Orthodontic dentistry Type to sectioned and unsectioned models, impressions, occlusion and articulator types, as well as a Mutlidie Mode, everything is there in plain sight. There is also a Clinic Mode for a more “chairside” style usage.

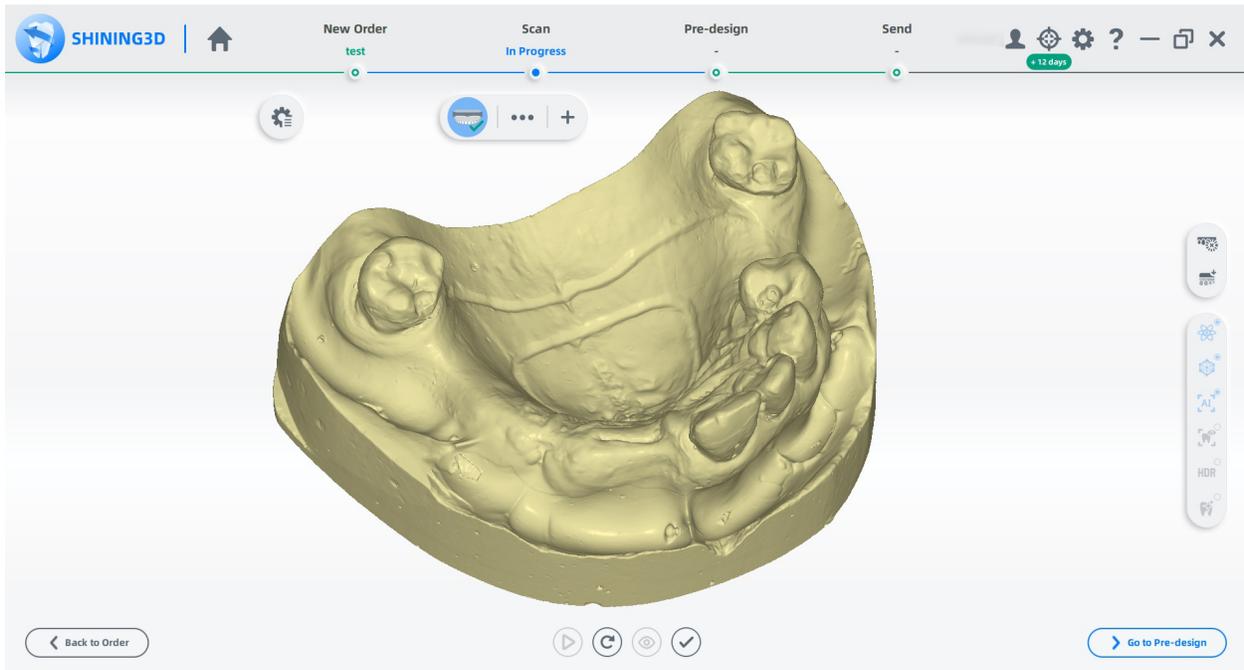
All exocad tooth indications are supported, so no more workaround required for, let’s say a full denture order.



Some of my favorite options are the ability to add, on the fly, a pre-op scan to the routine and also the ability to choose in which order you wish to scan the antagonist and the occlusion.

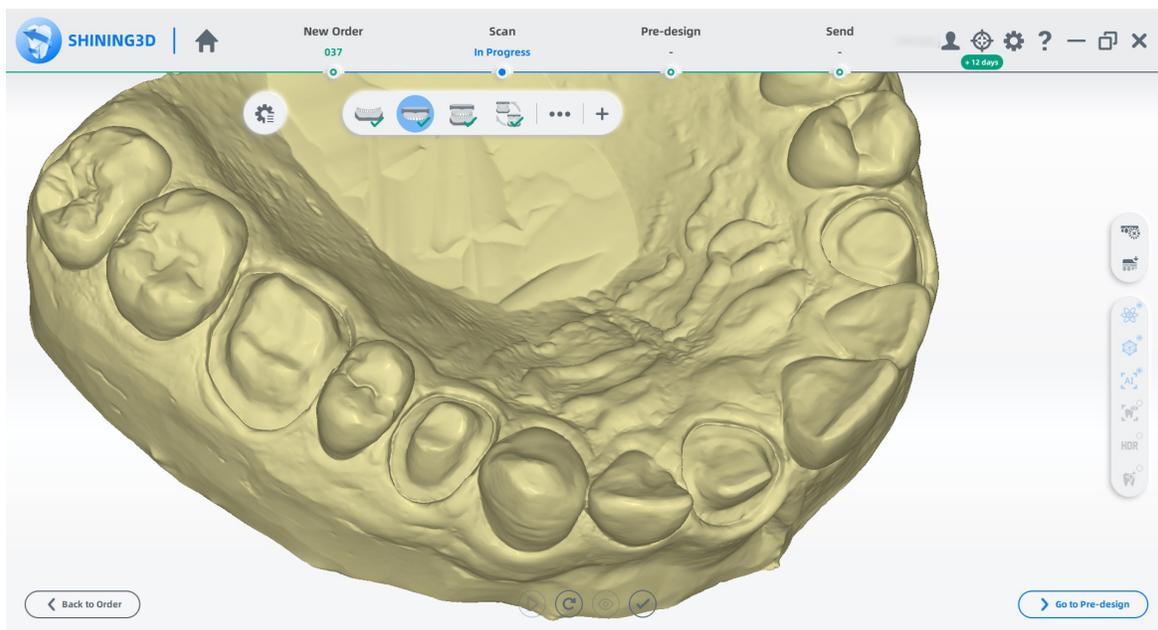


The DS-EX Pro H is fast, buttery smooth, and just breezed through all the models I threw at it with ease. Those two 5 MP cameras sure make a difference! Details are sharp and crisp.

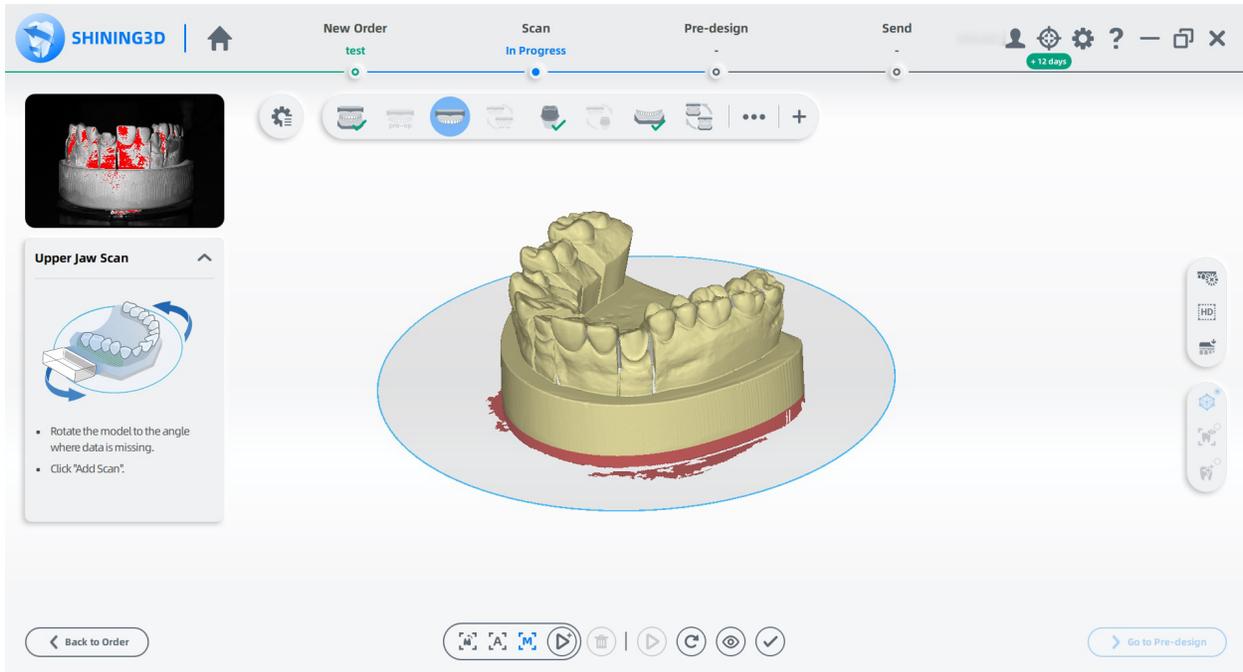




I was particularly impressed with its ability with uncut models. One particular model which gave me some grief in the past with the lower end DS-EX was a Geller type I made some time ago. The trenches around each preps are deep and sharp. Previously, with the DS-EX, I would end up with voids around the die margins. With the DS-EX Pro H, and Multi-path scanning enabled, it scanned this model in one shot, with no voids!



As mentioned previously, Shining 3D scanners are optimized for efficiency. A new addition to DentalScan, since version 3.0.0, is background processing which speeds up a routine dramatically. Each step of your scanning routine is laid out at the top and DentalScan has you move to the next step while it is processing the data of the previous one.



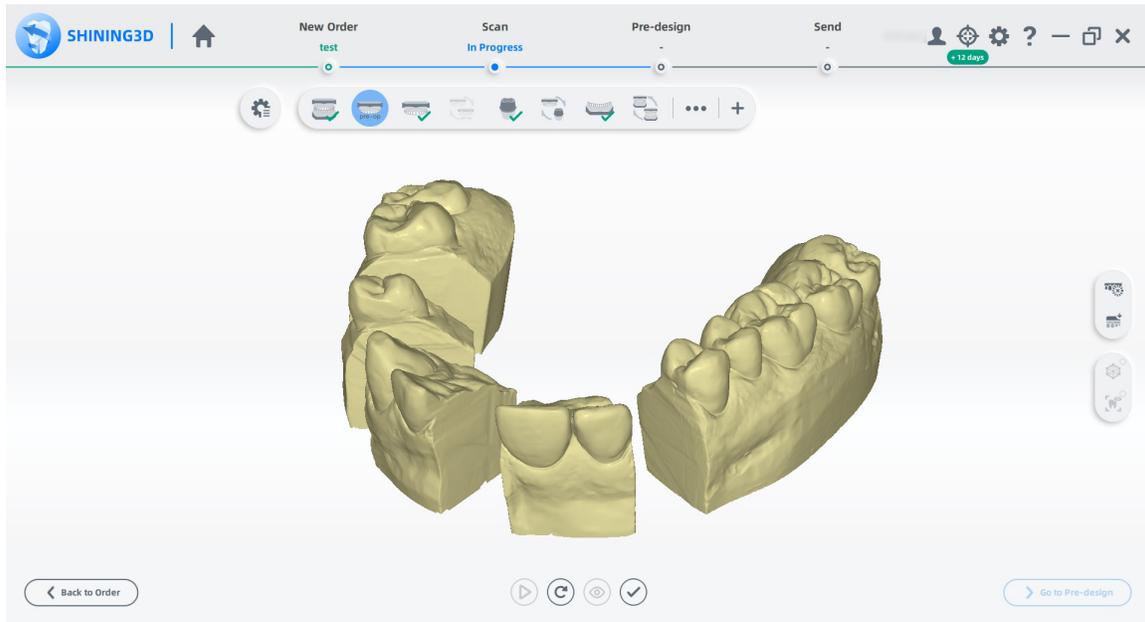
A green check mark lets you know when a step is complete, while a progress bar shows that it is processing data. You can also move back and forth through the completed steps at will, rescan, edit, or replace a scan with an imported one. The latter comes in handy for certain applications, as you will see shortly. You can even revisit completed orders at any time and rescan one or all models if need be. This is handy in cases of immediate restorations or denture relines.

Additionally, DentalScan will only render in super high detail what is needed, further speeding things up. Less polygons means faster rendering. In a sectioned model case, this means that only your dies will be rendered as such while the antagonist and the rest of the model will be rendered at a slightly lower polygon count. However, if you want everything to be rendered at maximum polygon count and details, you can do this also. This is where the scan import functions comes in handy. Allow me to demonstrate.

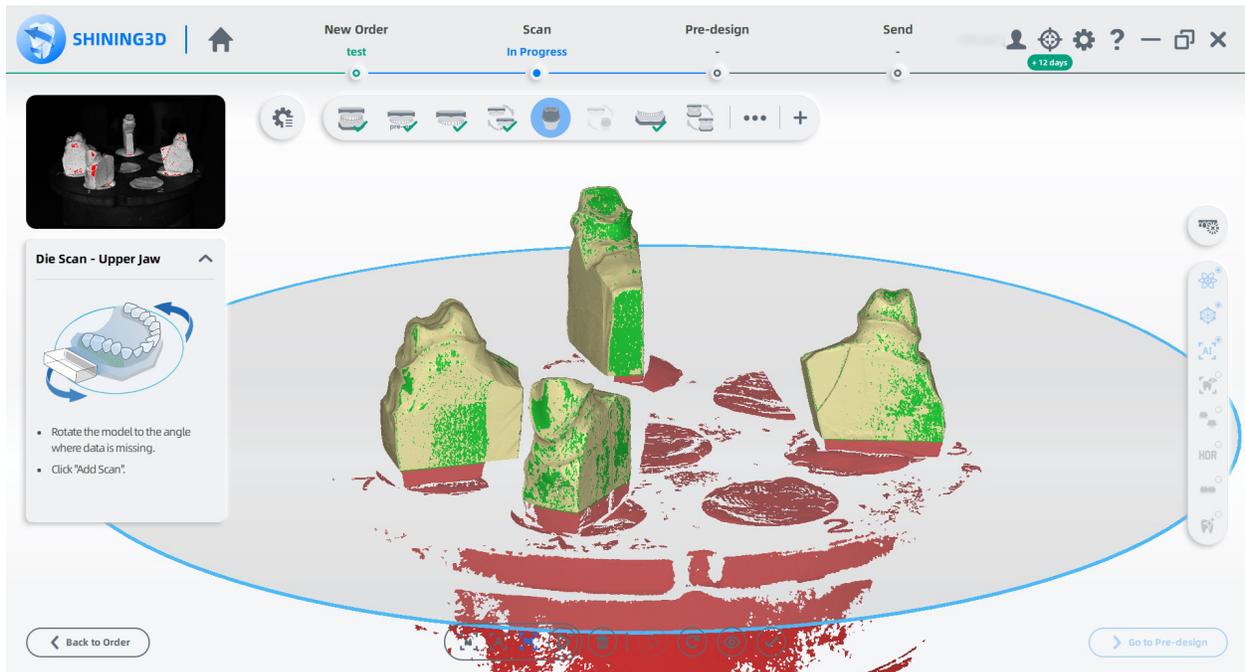
Let's say I want to turn the above sectioned case into a printable model, as a show or study piece, and want it all in full crisp details, including the antagonist. I first create an order for four upper anatomical crowns, on a sectioned model, in occlusion, with an antagonist, and add a pre-op, then save it. The pre-op in this case will be the exact same upper model, but with the dies removed. Doing this allows to

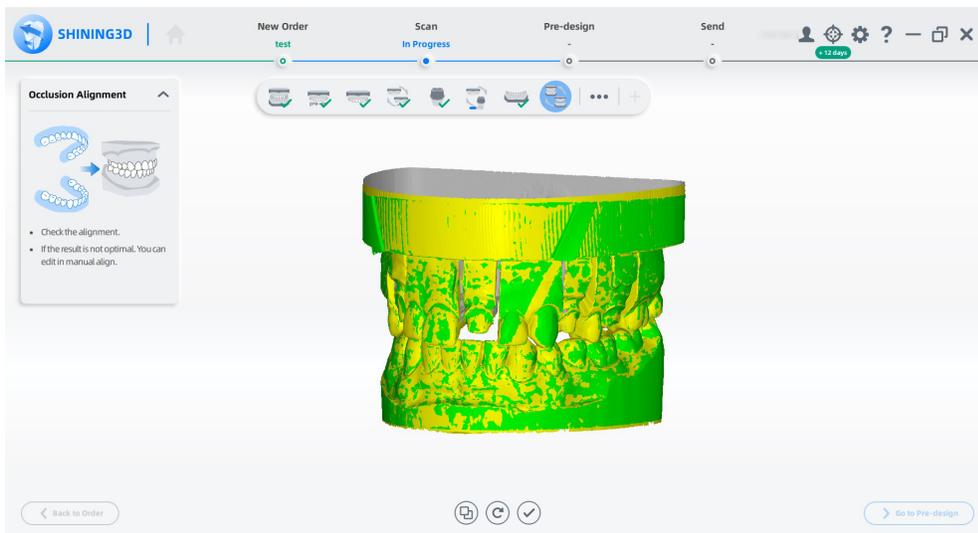
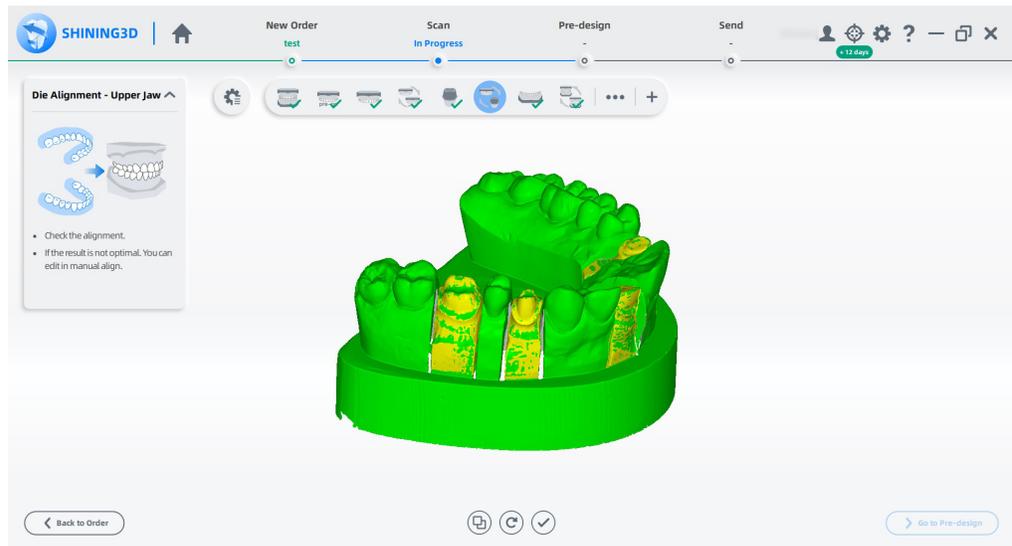
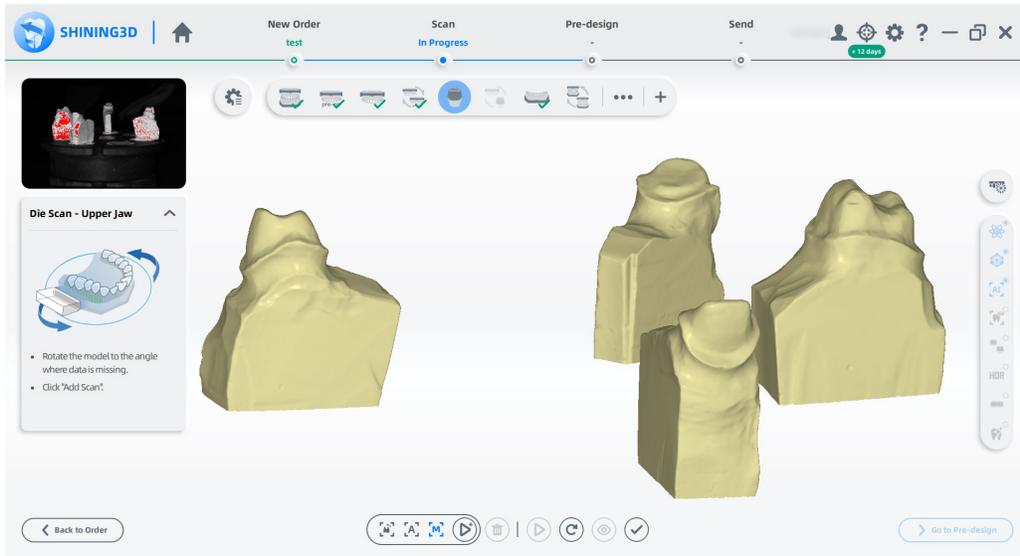
capture the obstructed areas in-between the dies and the interproximal teeth, all the way down to the base of the model. I am not proceeding to scan this order yet.

Secondly, I create a second order consisting of upper and lower anatomical crowns, unsectioned and in occlusion, and proceed with scanning the models. For the upper, I remove the dies from the model. Because these are unsectioned models and that both have tooth indications, DentalScan scans them at highest detail. Below is the unsectioned upper. This scan will be used as the pre-op in the first order.

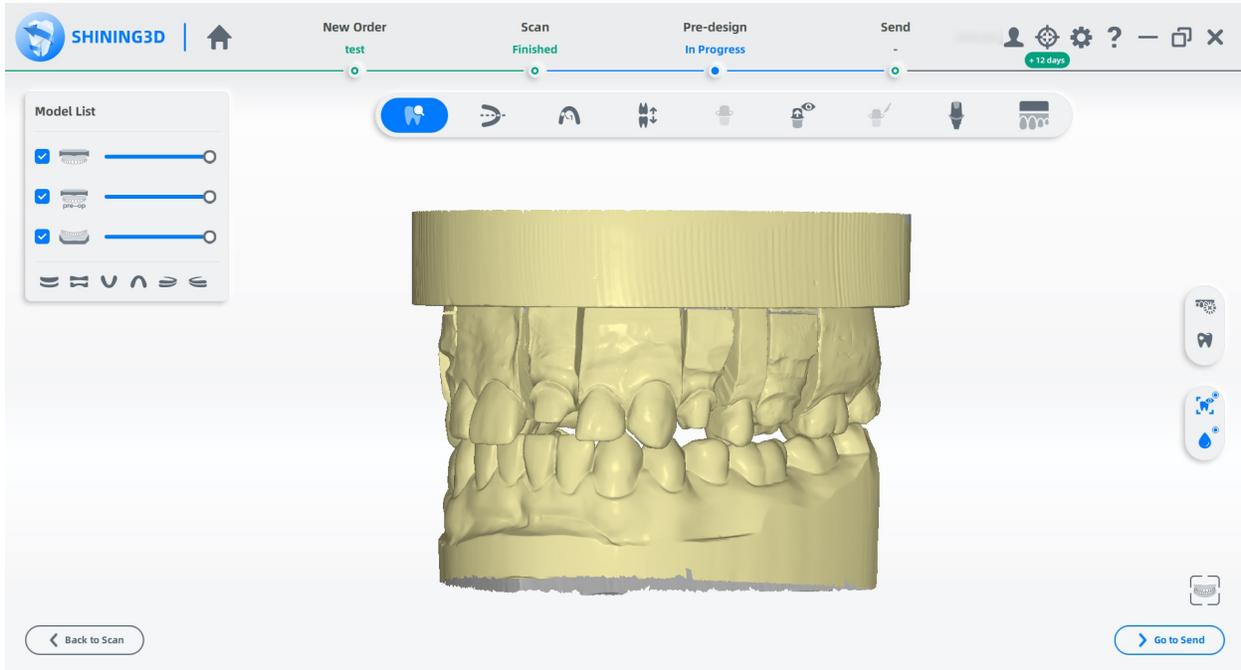


With the second order completed, I go back to the first one and proceed with the routine, scanning the upper, dies and bite in order.

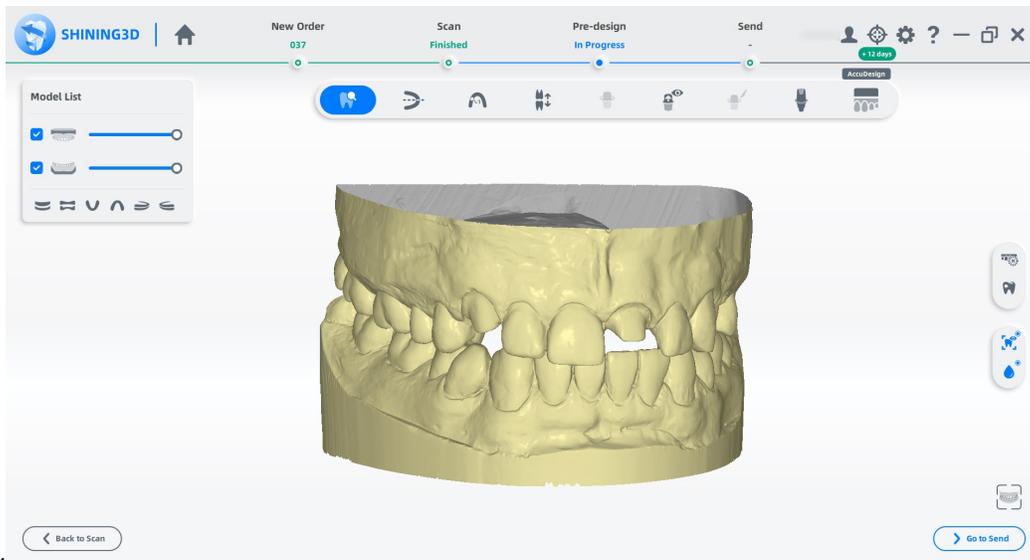


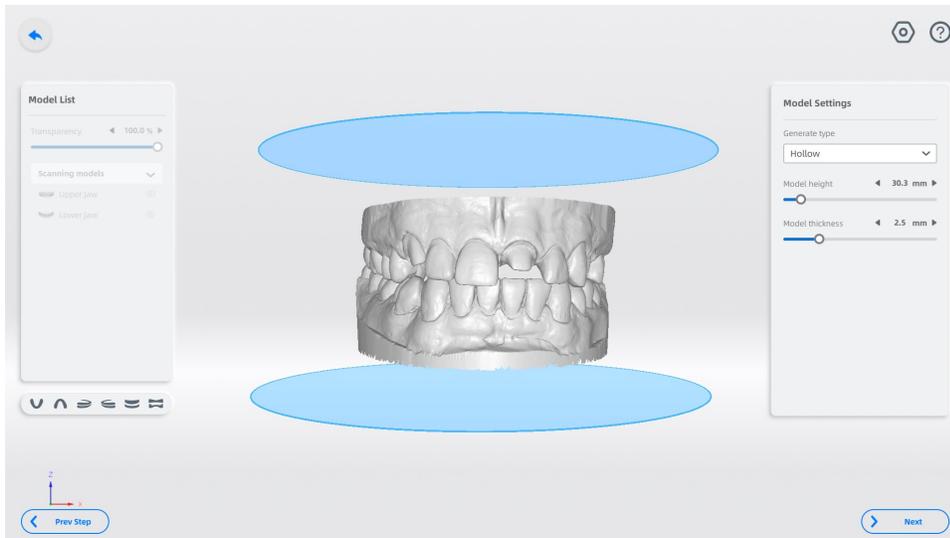


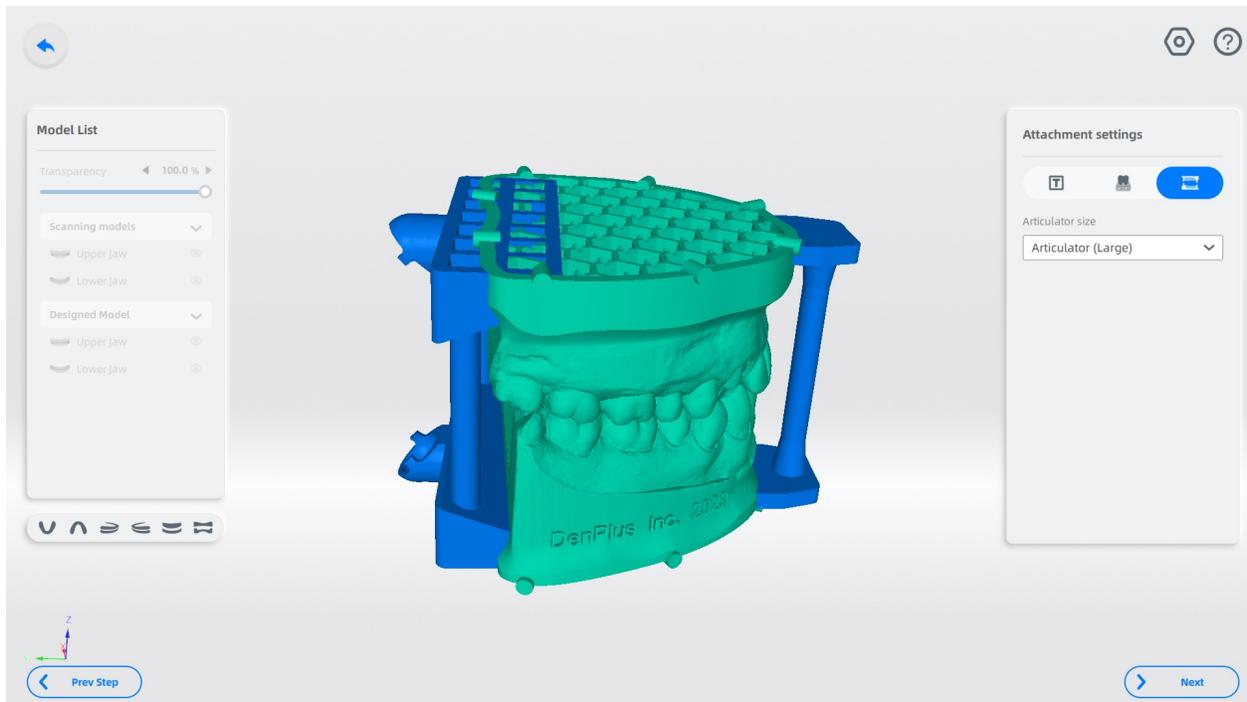
Now, when I reach the steps of scanning the pre-op and the antagonist, I instead import the scans from the second order. DentalScan has no issues automatically aligning these secondary models to the original case and the result is a complete case in full detail and with no gaps between the dies and the interproximal teeth.



At the end of a scanning routine, DentalScan presents you with a library of tools under a step they call “Pre-design”. These include standard scan editing for trimming off unwanted parts, an automatic void detection and fill tool with an adjustable threshold, tooth numbering, margin line identification, occlusion adjustment and so on. Some of these functions, like margin outline and tooth numbering, I believe, are only supported in exocad. Lastly, a model creation tool called AccuDesign is also at our disposal, for turning intraoral or unsectioned stl scans into printable models.







The latter works pretty well, minus a few quirks, however, by default, only saves the finished printable files as .beb, which to the best of my knowledge, can only be used with a Shining 3D printer. An additional step is required to export the constructed models in stl format, which I consider a mild annoyance from an otherwise solid, and not to mention completely free software.

In any case, the raw scans themselves are saved as universal .stl, along with their positional coordinates. You can take them into any model creation application from there on.

Dental Impressions

Also put to the test, a selection of scannable and non-scannable PVS impressions which had given me some difficulty on the DS-EX.

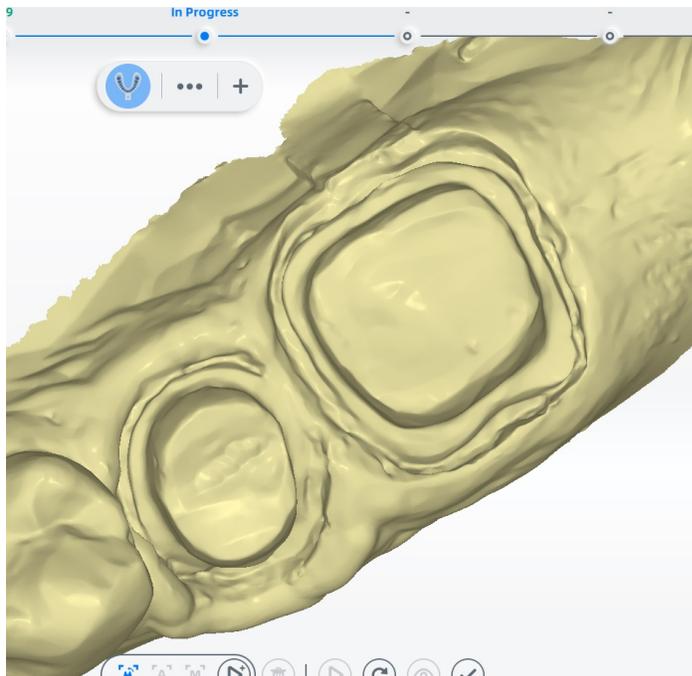
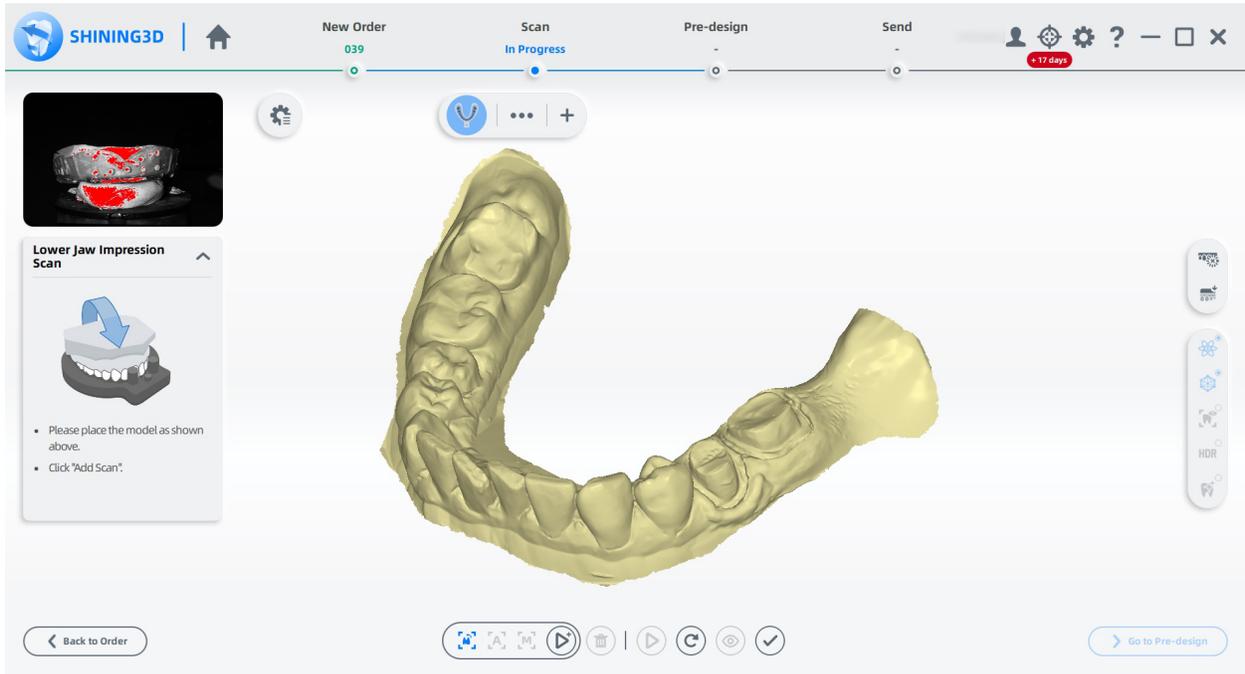
The DS-EX Pro H, equipped with the rotating camera head should have an easier time reaching those deep recesses and narrow anterior incisal edges than the DS-EX. It's worth mentioning that applying a fine mist of scan spray, even on scannable VPS can do wonders to capture those stubborn areas. In my case, I'm using Scantist 3D Vanishing spray.



For impression trays with handles, the scanner comes with a designated scanning tray that clamps the handle and raises the impression to the required height. For those without a handle, not a problem. The impression can still be scanned on a standard tray, as was my situation for two of my chosen impressions.

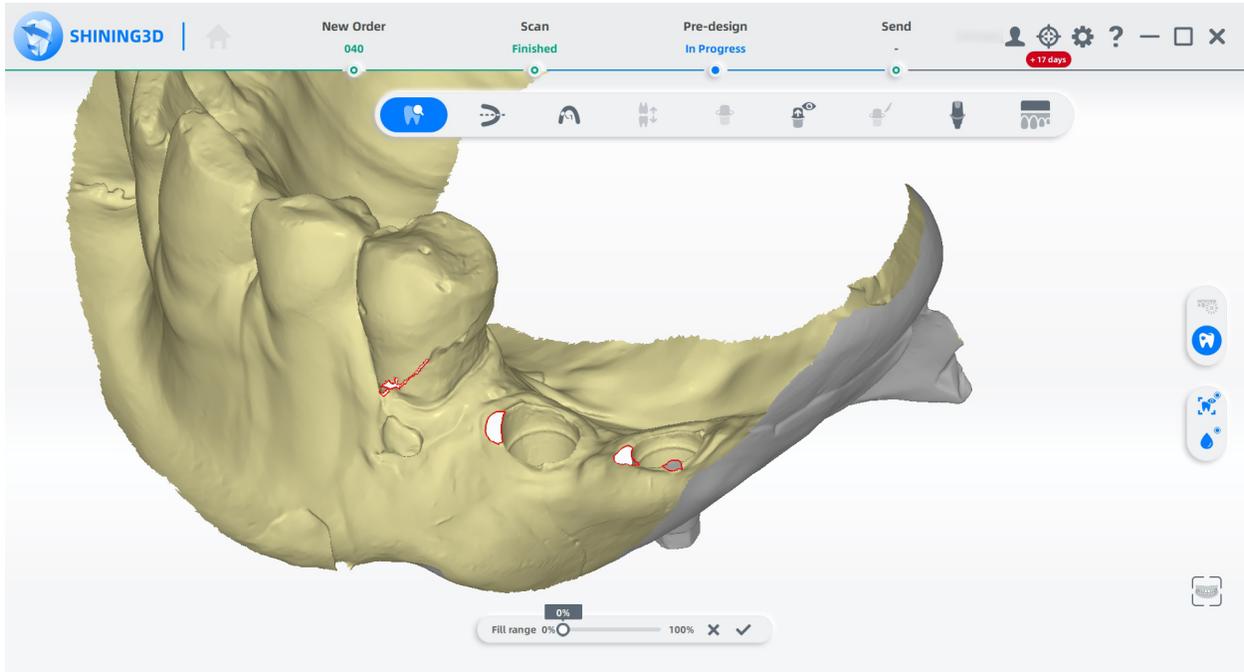


Once again, the DS-EX Pro H doesn't disappoint. After a single pass, the impressions are practically whole, with a few minor voids which DentalScan's Intelligent and Manual Add-Scan functions handle with ease.

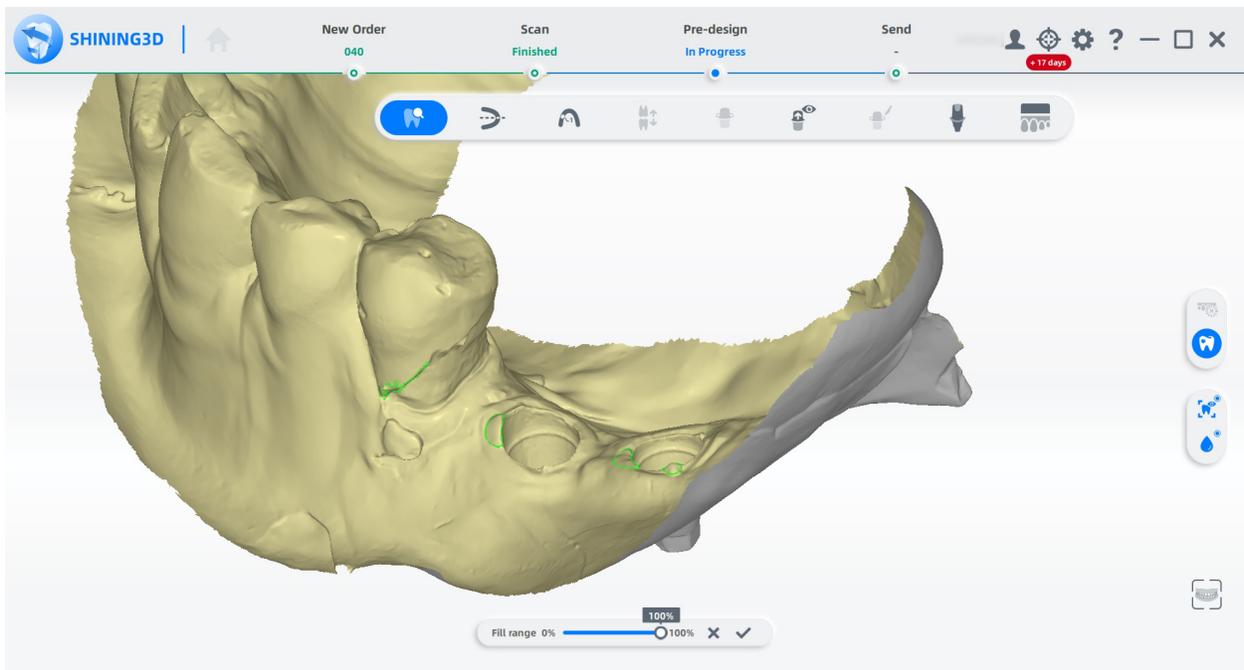


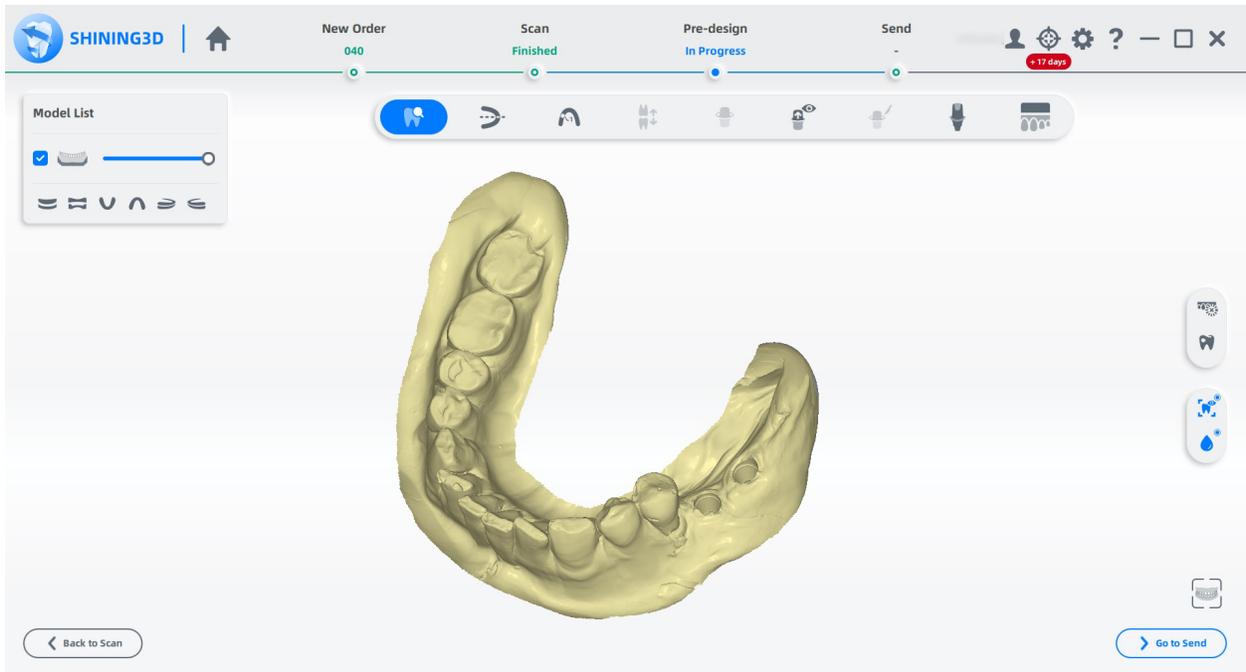
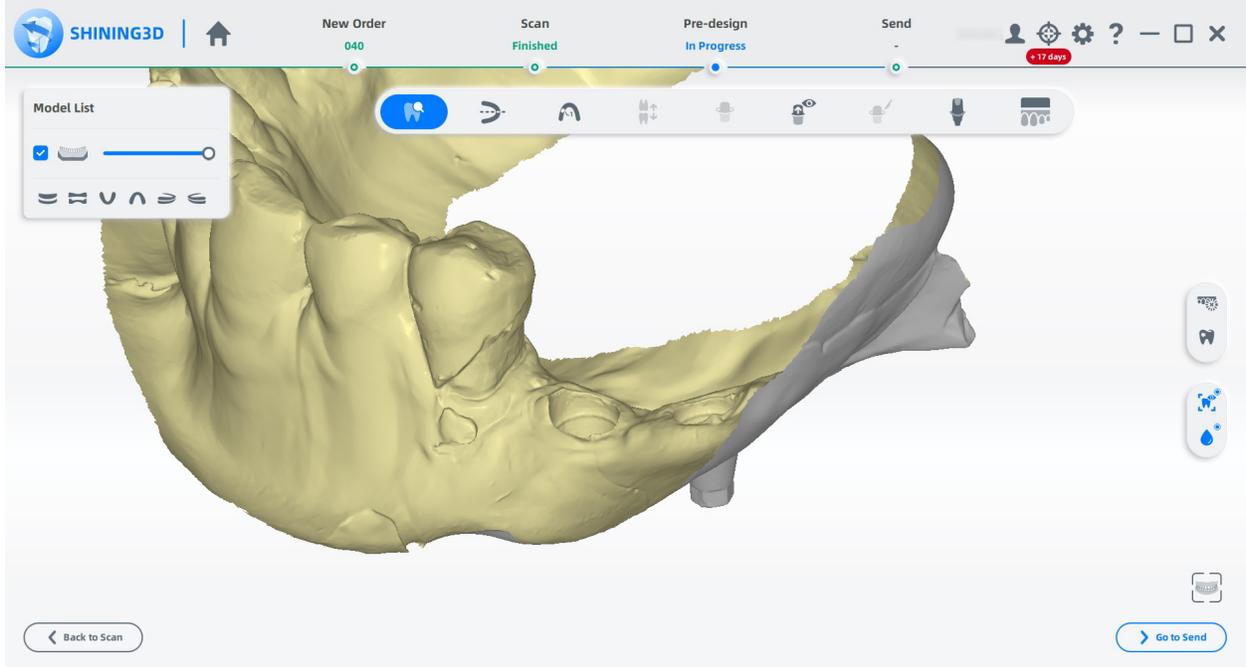
The DS-EX Pro H had no difficulty capturing the deep and narrow through around the preps of this impression, an area that the DS-EX had struggled with in the past.

DentalScan's editing tools make quick work of cleaning up dental impression scans, to keep only what you need. The void detection and fill function works smart as well. In the example below, the impression had an air bubble around each of the implant analogs, which had been captured whole. After trimming those out in editing, the void detection and fill function took care of gracefully filling out the two holes that I had created.

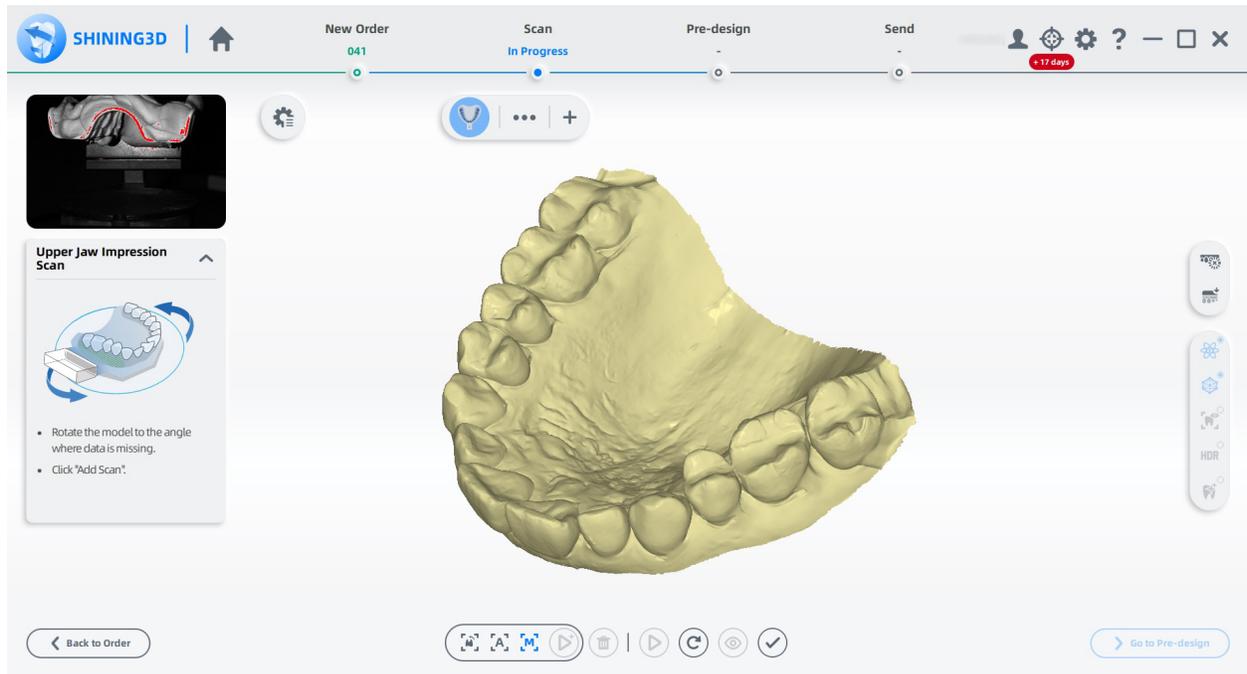


A narrow diagonal void on a bicuspid was also handled subtly at the same time.





Out of the four dental impressions that I had selected for this test, only the upper impression was left with very small voids at the lingual of the incisal borders of the centrals, which were automatically filled in by the software.



With my scans finished, I went ahead and 3D printed the models. It was now time to test the fit of my zirconia crowns and cast partial frameworks on them.

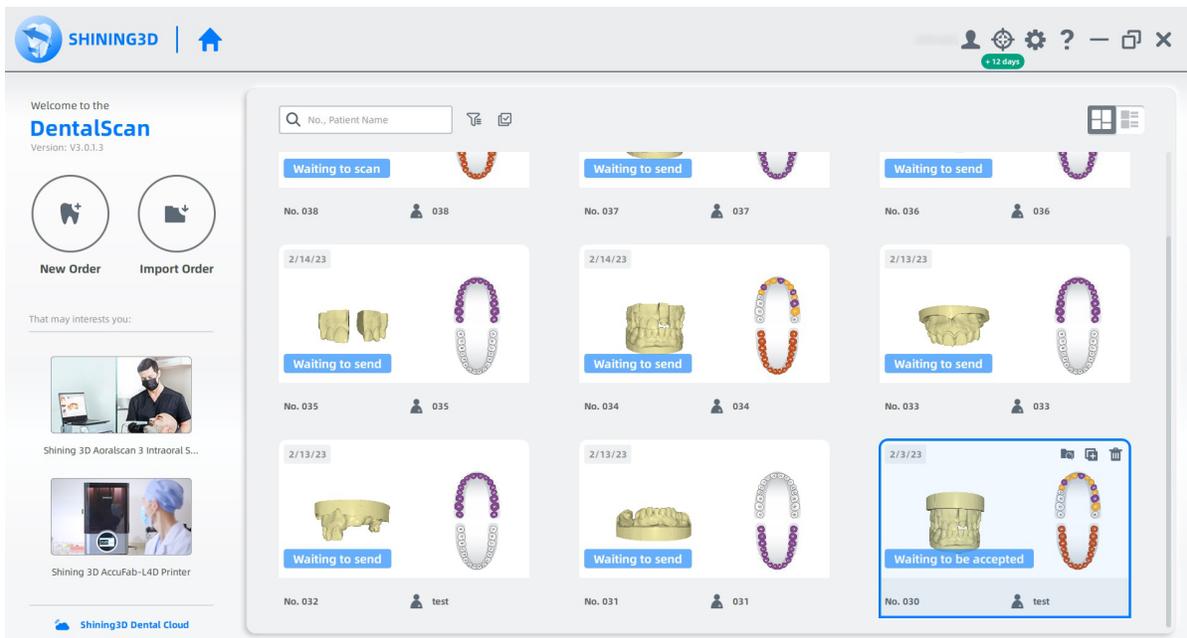
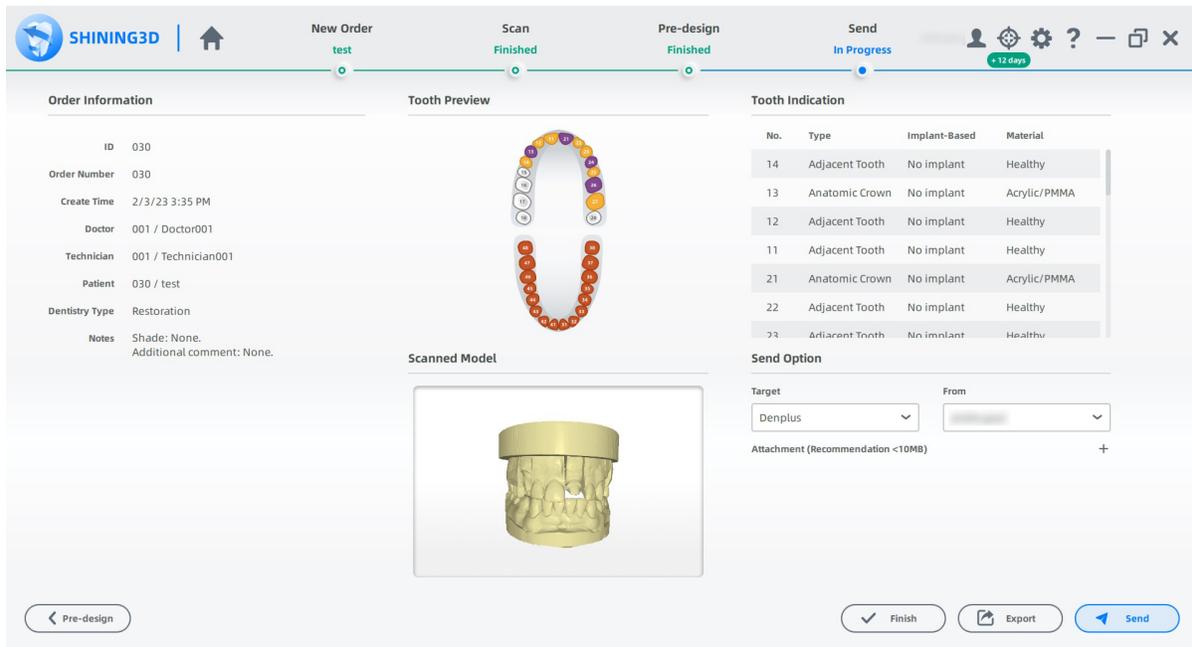
As expected, my test results showed that the DS-EX Pro H is a very accurate scanner, capable of handling a wide range of situations. My zirconia restorations and cast partial frameworks displayed a very faithful adaptation, even under magnification.





Lastly, a scanning software would not be complete without the ability to deliver your files to your clients via a cloud based server, if you wish to do so. It was years in the making but Shining 3D finally made this happen in a straight forward manner that we can all understand.

Shining 3D's cloud based dental server is as simple as they come. Your clients create their own account on the server, send you a connection request, which you accept. From then on you can select your recipient at the end of your scanning routine, from your list of connections, and upload the files. The recipient receives an email notification of awaiting orders and can download them at will. Once they have been downloaded by the recipient, you are notified and that is pretty much all there is to it. Oh, and did I mention that there is no licensing fees?



All in all the DS-EX Pro H is a home run. Sure, the software has a few quirks such as a high RAM usage under certain conditions but overall, the value it offers is hard to beat. It is an outstanding option as a first scanner, or as a secondary without breaking the bank. Well done Shining 3D!