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Geomagic Studio and Wrap 2012

It's been sixteen months since Geomagic's Studio and Wrap V12 were released, and now the latest update has a new revision number, 2012 -- to avoid calling it "v13," I suppose. Senior product manager Kevin Scofield last week walked me through what's new and improved.

Geomagic's software reads data points from laser and other scanners, and then helps you convert the millions of dots into 3D surfaces and solids, following which the objects are translated for use in 3D CAD systems.

Release 2012 handles a larger number of data points, and speeds up the processing of data some 10-40%. Despite the fact that this software is meant for working with large data sets, Geomagic is surprised that a slight majority of its customers still use 32-bit computers -- ones that are limited to 3GB RAM, which limits the amount of data that can be stored in memory without paging to disk (a slowing-down process). To make these users happy, Geomagic improved the speed through better memory management and multi-threading.

In Geomagic 2012 you can create your own commands by tying custom ribbon buttons to custom scripts. A neat feature is searching for commands: as you type in letters of a command, such as "B-O-U-N," the ribbon contracts with each letter to show just those commands starting with "b," "bo," "bou," and "boun."

The software doesn't use layers, and so there was no way to turn off parts. In 2012, you can turn off unwanted elements and when saved, only the visible elements are shown next time the file is opened. Objects (or rather, clumps of points, such as a chair or statute) can be isolated to view just a few million points (!).

You can now filter points by distance, such as to see only the scan data between 3m and 30m. This can get rid of accidentally scan bits, like trees across the street. Until now, you could not go inside buildings, for Geomagic just had clipping planes. So, now you can do walk-thrus, and can place the camera at the same point the at which the scanner was located to get the best view of the room.

There is a new option to handle sparse points and areas with holes, and it reduces the amount of overlap from two or more scans. Some customers want to create new solids from non-solid CAD geometry, such as mesh data from a FEA package. In 2012, you can specify sharp edges and re-polygonize the mesh to make it dense. A new surfacing routine fits polygons to the data -- almost like shrinkwrapping.

When areas are not scanned, data is missing, and Geomagic used to interpolate the missing bits. A solution is to rescan for the missing areas, and a new tool aligns the added scan data to existing ones. In other cases, you might take advantage of the model's symmetry to fill in missed areas: mirror or copy another area to patch the hole, and then use the new deformation tool to "smoosh" the patch smoothly.

Geomagic exports its models to "any" CAD package through neutral file formats, but 2012 now adds a "Send to SpaceClaim" button for transferring the file to SpaceClaim for direct editing.

Mattel uses Geomagic to reverse-engineer their toys for theme parts, or to take older products like Hot Wheels or Barbie for which CAD files do not exist. Or to add new accessories for Barbie. Automotive companies use the software to reverse-engineer their own tooling, as well as parts on the vehicles of competitors. Consumer goods, too, like for iPhone cases, becuse Apple does not provide CAD models to third parties.

Wrap is the cheapest module at $8,000; the full suite is $20,000. The company is thinking of getting into the consumer market, but is waiting to see which technology pulls ahead. "We're all carrying scanners around in our pocket, and now we need software to stitch it together," said Mr Scofield. The problem with photogrammic scanning, however, is that it lacks accuracy and cameras tend to skew the image (wide angle bulging). So, it is good enough for video games and Google Earth, but not for manufacturing. Computationally, it is not an easy problem to solve, but it could well be the 3D scanning technique of the future.

http://www.geomagic.com