



ACTINAV - CREATING YOUR OWN PART MODELS WITH THE EINSKAN SE

These instructions describe how to make an ActiNav-compatible 3D scan yourself

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The Einscan SE is a moderately priced desktop scanner from Shining3D. It can create 3D meshes for parts that don't have a CAD file or a commercially created scan.

CREATE THE SCAN

- Prepare the sample part. For reflective parts, the part needs to be made non-reflective. Use white matte spray to coat shiny parts. (e.g. <https://www.amazon.com/Rust-Oleum-302591-Chalked-Spray-Paint/dp/B01J45643S>)
- Download spec sheet and user manual from Einscan: <https://www.einscan.com/desktop-3d-scanners/einscan-se/>
- Follow the user manual procedure for hardware installation, license activation, and to create/clean a mesh.
 - Refer to this [video](#) on how to create a mesh specifically for ActiNav:
 - Alternatively, here is a more general youtube video: <https://www.youtube.com/watch?v=HNNHbPjbl8ug>
 - For ActiNav, use the following settings in Einscan software:
 - Select non-texture mode of scanning
 - Choose appropriate brightness/shade for scanning. Check camera view for redness. Red means over exposed. A little overexposure is OK.
 - Start with 8 turntable steps. Increase the number of steps only if you want to capture very accurate surface details (Rarely necessary for ActiNav).
 - Once a scan is completed, delete any unnecessary points with the "edit/remove" tool. Save the scan.
 - Remember that for bin picking you must have a model that shows all sides of a part. To capture the full 360 degree of part (such as the bottom that is on the turntable), you will need to scan multiple orientations. Change the position of the part on the turntable so the missing pieces are visible to the scanner, and repeat the above steps for each orientation.
 - The software will align scans iteratively. If automatic mode does not yield a good match then feel free to use "Align" tool on the right toolbar to manually align scans by selecting three different points on each scan
 - Once you're satisfied with the final merged scan, convert this to a mesh. Click "Mesh" tool and select "Unwatertight" model to generate a 3D mesh
 - Use default settings -or- feel free to fine tune for filling hole lengths, polygons,.. Bear in mind that you only need to model the surfaces that the 3D sensor can see, and only good enough to locate the part in space.
 - Once a mesh is produced, save the file as .obj or .stl and use 100% as scale.

(ADVANCED) REFINE THE MODEL WITH MESHLAB

For best performance and easiest editing in ActiNav, the part mesh should have its origin in a reasonable place, and have an appropriate number of faces in the mesh. If the model was created incorrectly, it may also be necessary to change the scale. Some models also have unavoidable flaws due to reflections or gaps.

MeshLab is an open source system for processing and editing 3D triangular meshes. It is available for download at <http://www.meshlab.net/#download>. There are many tutorials, videos, and user groups available for using MeshLab.

SCALING

ActiNav requires the mesh to be scaled in millimeters. A simple set of instructions can be found at <https://sites.google.com/site/3dprintfaq/shapeways/faq/modeliswrongsizehowdoiresizeitcorrectly>

RESET ORIGIN

To avoid trouble defining clearance shapes, and to take advantage of part symmetry when defining picks, verify the origin of the part model is within the volume of the part, and with its axes aligned to the rotational symmetry of the part. An example that simply centers the origin in the model can be found at <https://revthat.com/updates/origin-meshes-meshlab/>.

CLEANING UP A MESH

If the Einscan scanner is unable to mesh important surface details (noisy mesh) accurately enough to be detected by ActiNav's 3D sensor, the mesh may need to be cleaned. An example can be found at

https://en.wikiversity.org/wiki/MakerBot/Cleaning_Up_Point_Cloud_Meshes_in_Meshlab_For_3D_Printing

REDUCE NUMBER OF FACES

This is also called Simplifying or Decimating. For best ActiNav performance and easiest import, try to have fewer than 50,000 faces. An example of how to do this: <https://www.youtube.com/watch?v=mK1n35gnpg4>

