

Preparing files for a ninjaCap build

Inputs to our ninjaCap framework are

1. a "probe.SD" file that describes the geometrical setup (as documented in the Homer2 toolbox) and the grommet types to be used. NOTE: For this you need the latest version of the AtlasViewer GUI (May 2020 or newer)
2. the desired headcircumference in cm.

Outputs of this code are four .stl files for 3D printing with ninjaflex.

Create your "probe.SD" using the the SDgui of the latest version of AtlasViewer (May 2020 or newer) that you can find [here](https://github.com/BUNPC/AtlasViewer):

<https://github.com/BUNPC/AtlasViewer>

For each source, detector AND dummy optode, select the Grommet Type of that optode. The Grommet Type is an identifier that is used in the cap generation to place the desired element (holder, grommet, ...) at the position of the corresponding optode. The available types of grommets and their corresponding identifiers are given in the table on the next page. Selecting the type "#NONE" will skip the placement of an element for this optode. You can assign any Grommet Type identifier to any optode (source, detector, and dummy optodes)!

Please note for Short Separation (SS) Measurements:

Depending on the type of grommet you choose, short separation channels (holes for a SS fiber) are typically already included. In your SD probe layout, you might have added dedicated SS optodes. If you did, just give those a "#NONE" ID to skip the placement of a dedicated element at the SS optode location.

Save that configuration under the name "probe" with the native ".SD" file extension under ...\\ninjaCap\\userinput\\probe.SD.

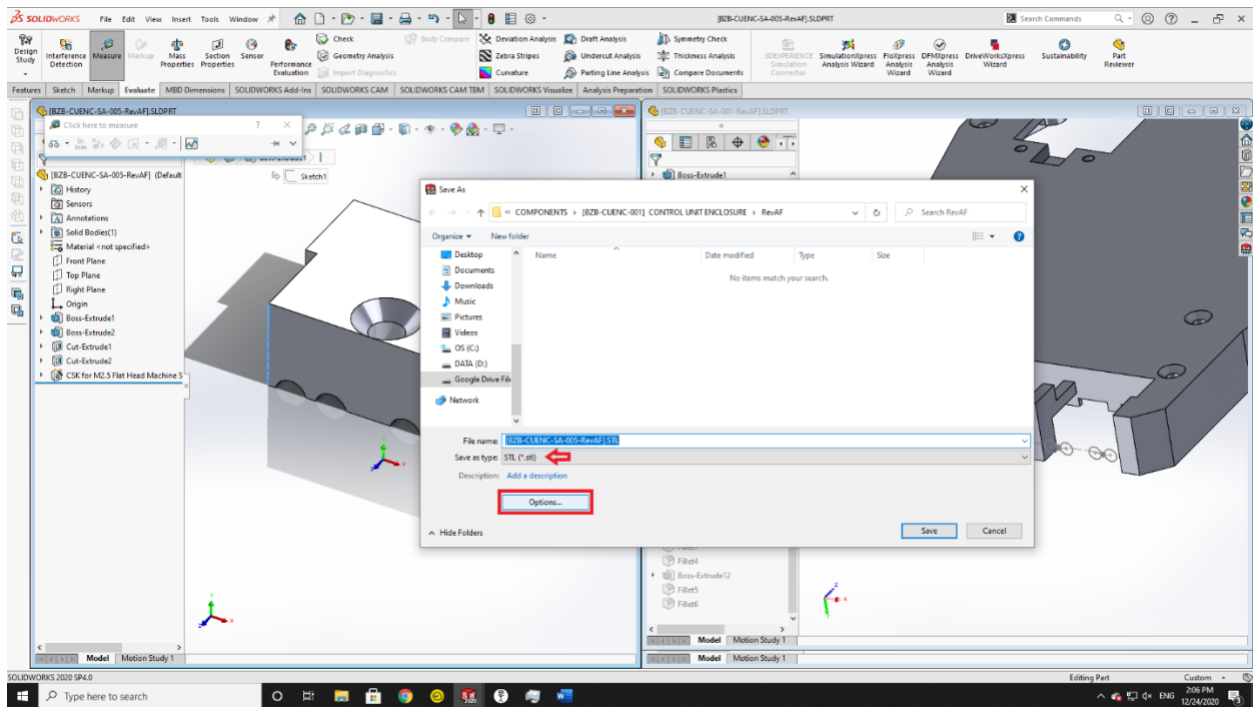
If you want to add your own (custom) Grommet Type:

When saving the STL for a new grommet you must ensure that the grommet is aligned on the X-Y plane as the bottom surface of the grommet and the origin point for both the grommet and the compliment must be the center of the object for the optode to ensure correct grommet placement on the ninjaCap. To ensure this is done correctly using Solidworks, when exporting the STL from the solidworks part under options select options:

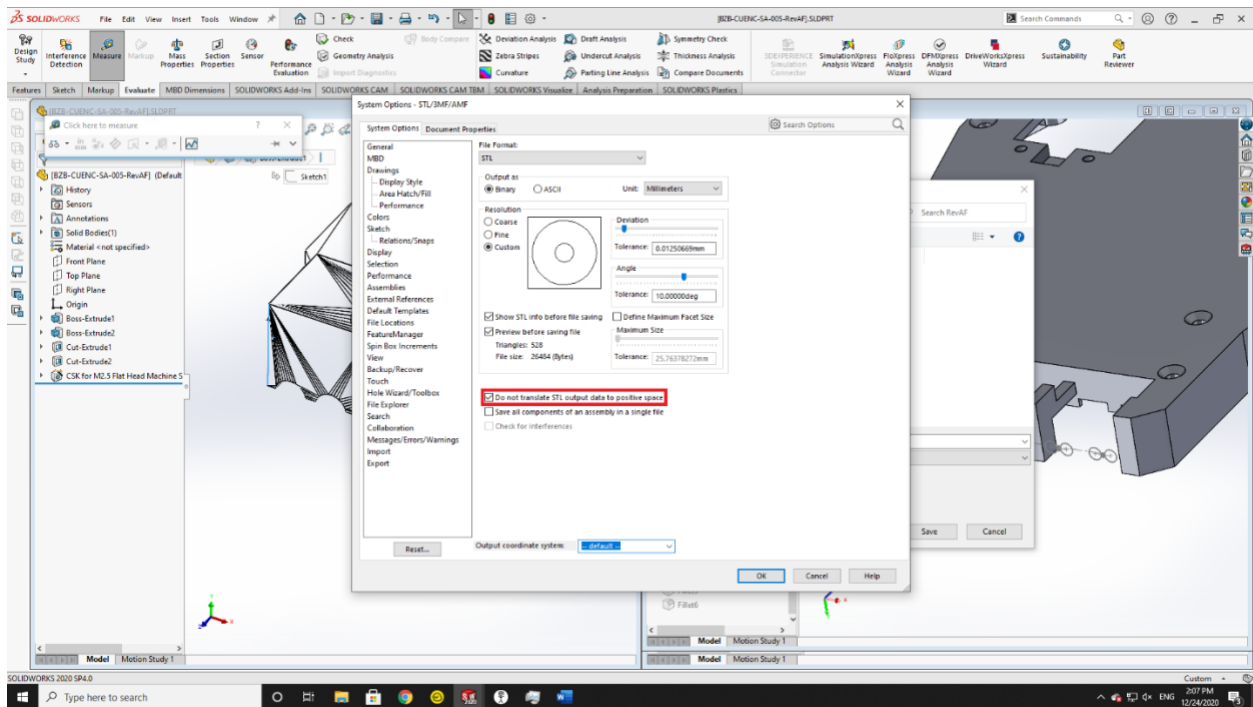
The screenshot shows the 'Optodes' window in the AtlasViewer SDgui. It contains two tables: 'Sources' and 'Detectors'. Each table has columns for an index, x, y, z coordinates, and a 'Grommet Type' dropdown menu. The 'Sources' table has 9 rows, and the 'Detectors' table has 11 rows. The 'Grommet Type' dropdowns are currently set to various identifiers like #NFLPS, #NFWMS, #NFHPS, #NOND1, #NFHPS, #NFDSD, #PMRK1, and #NOND1.

	x	y	z	Grommet Type
1	-45	0	0	#NFLPS
2	15	0	0	#NFWMS
3	-15	30	0	#NFHPS
4	45	30	0	#NOND1
5				
6				
7				
8				
9				

	x	y	z	Grommet Type
1	-15	0	0	#NFHPS
2	45	0	0	#NFDSD
3	-45	30	0	#PMRK1
4	15	30	0	#NOND1
5				
6				
7				
8				
9				
10				
11				



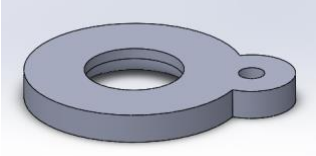
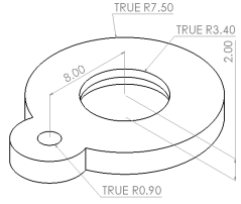
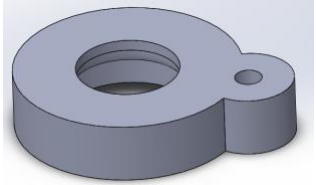
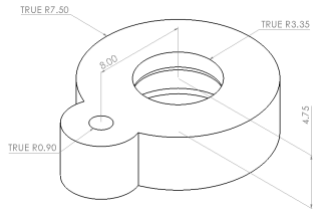
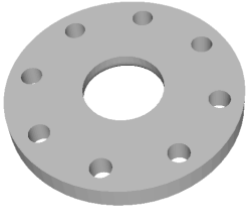
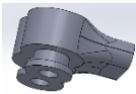
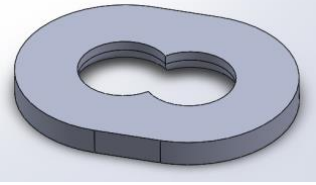
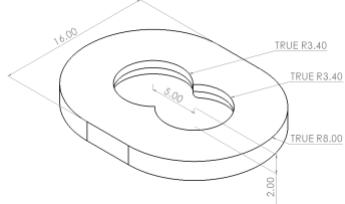
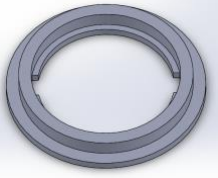
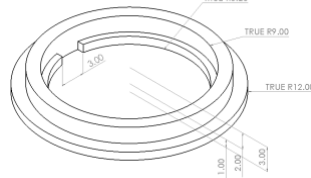

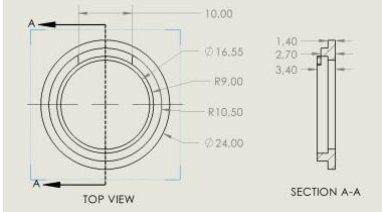
After pressing options you will be brought to a menu shown below, select the highlighted option and click ok then save the grommet/complement file.

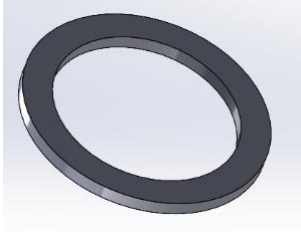
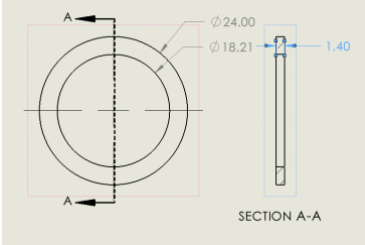
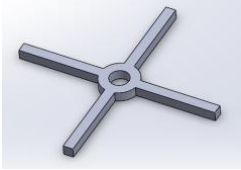
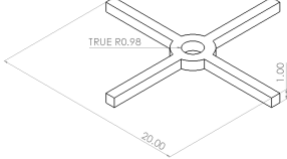
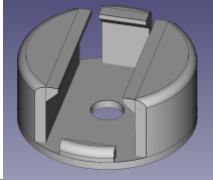


STL files for these elements are placed under
 .../ninjaCap/stl/elements/<identifier>/...

where <identifier> is the folder name identical to the defined string ID. Files within are always “grommet.stl” and “grommetComplement.stl”, where “grommet” is the element to be placed, and “grommetComplement” is the keep out geometry used to create corresponding holes/spaces in the panel grids. This compliment must be the same size as the needed gap in the pattern of the panel grids for the hole produced by the grommet. These “grommets” can have any geometry and can also be elements that are not “grommets” after all. If your grommet ID is not available in AtlasViewer, you can select any type

and manually change them to your new custom ID by manually opening the SD file in matlab and changing the entries in the following three fields of SD struct: 'SrcGrommetType', 'DetGrommetType' and 'DummyGrommetType'.

Identifier	Info	Image	Dimensions
#NFLPS	NIRS: Fiber-based optode holder (CW6 fibers) with Low Profile and single Short-separation hole		
#NFHPS	NIRS: Fiber-based optode holder (CW6 fibers) with High Profile and single Short-separation hole		
#NFWMS	NIRS: Fiber-based Wide optode holder (CW6 fibers) with Multiple Short-separation holes		<p>Inner radius: 03.4 mm Outer radius: 08.0 mm Height: 02.0 mm SS Distance: 08.0 mm SS radius: 0.90 mm</p>
#NFDSO	NIRS: Fiber-based Dual Ss Optode holder 		
#NOND1	NIRS: Open fNIRS Dual optode holder for optodes in printed case		
#NOND2	NIRS: Open fNIRS dual optode holder for optodes in printed cases Rev AB through Rev AD		

#NOND3	NIRS: Open fNIRS dual optode holder for optodes in printed cases Rev AE and later		
#PMRK1	Position MaRKer in small cross shape, symmetric		
#ACHLD	ninjaNIRS Accelerometer HoLDer		21 mm diameter 10 mm height

Continued on the next page...

#EBPAS (currently N/A)	EEG electrode holder from Brain Products: ActiCap Snap		
#EECEH (currently N/A)	EEG Easy Cap Electrode Holder: Ring for commercial electrode holders	Tbd	Tbd
#NONE	Dummy Optode, nothing placed	None	None