Assembly instructions: continuum structure

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Overview testbed

Upper plattform

Silicon cylinder

Slilicon connection plate

Center pulleys

Distance spacer

Frame with acrylic glass

Pulley swing

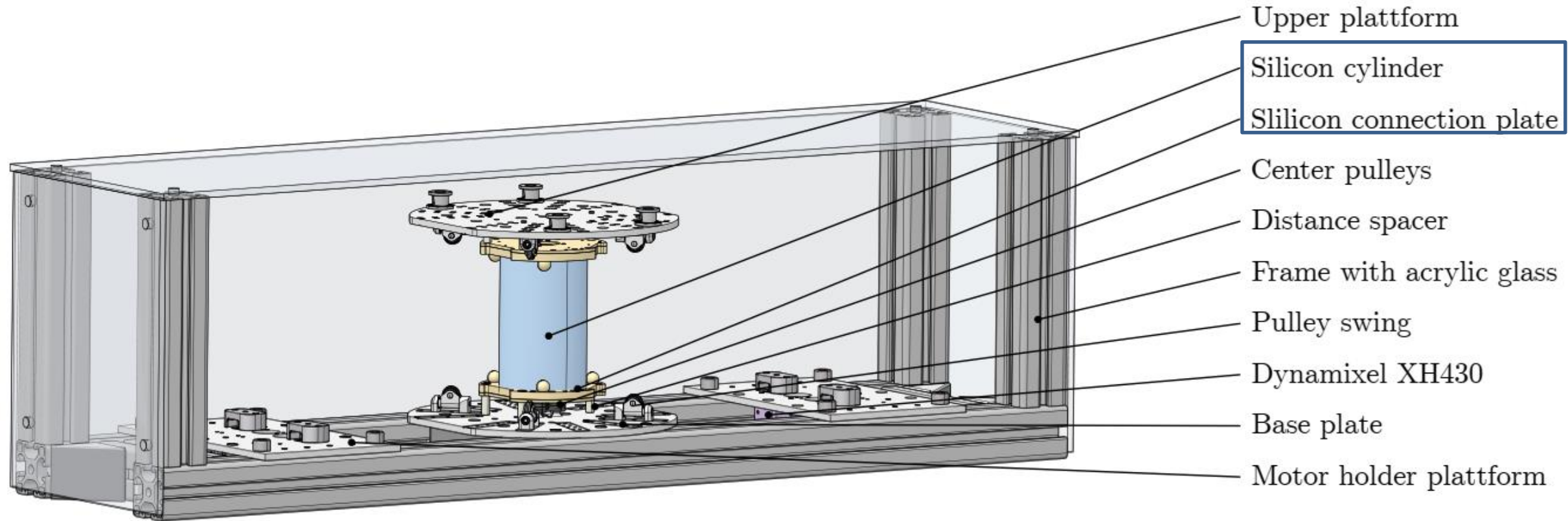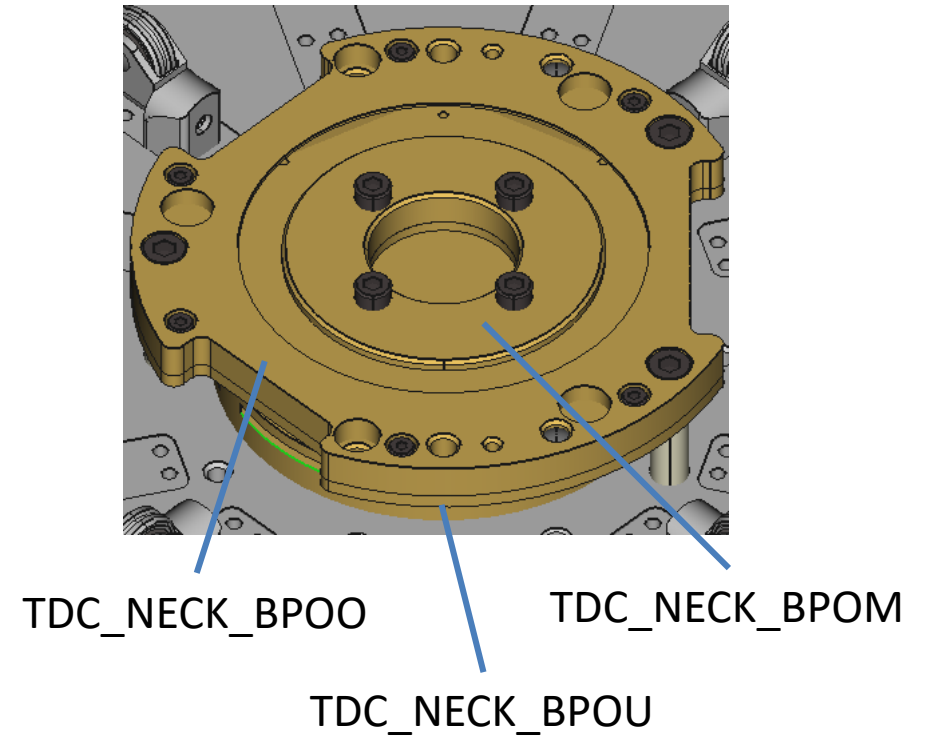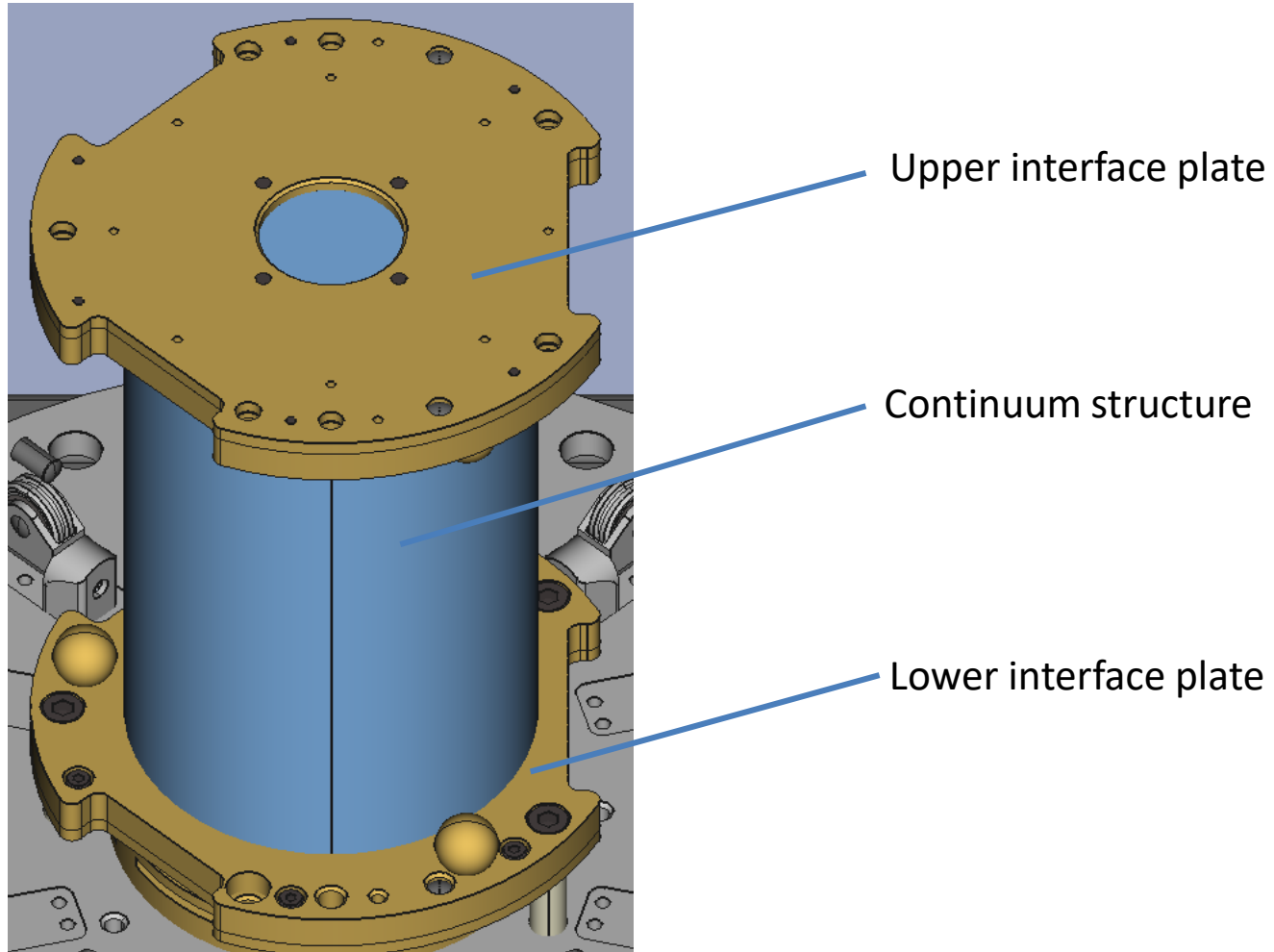Dynamixel XH430

Base plate

Motor holder plattform

Fig. 2: Overview of the proposed open source tendon-driven continuum mechanism with all involved components.

Overview of the contiuum structure

Upper interface plate

Continuum structure

Lower interface plate

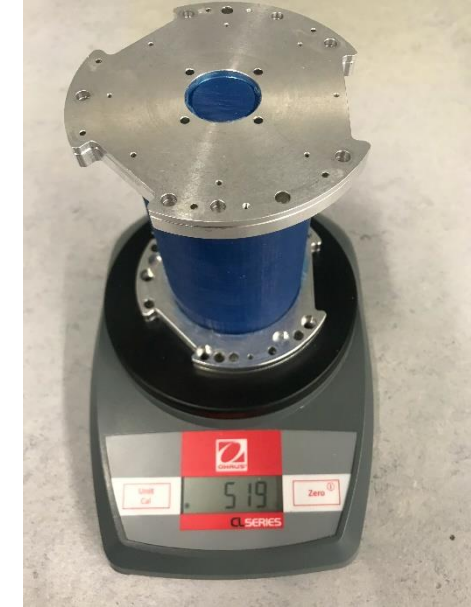TDC_NECK_BPOO

TDC_NECK_BPOM

TDC_NECK_BPOU

Continuum structure components

Manufacturing parts:

- Interface plate (3 parts)
    - Lower part interface plate (TDC_NECK_BPOU)
    - upper part interface plate (TDC_NECK_BPOO)
    - Middle part interface plate (TDC_NECK_BPOM)
    - Molds (3D-printed)
    - Funnel (3D-printed)

Off-the-shelf parts:

- 2x2x dowel pin h6 ⌀4x8
- 2x6x Cylinderhead screw M2x6
- 2x4x Cylinderhead screw M3x8
- 6x Cylinderhead screw M3x8mm
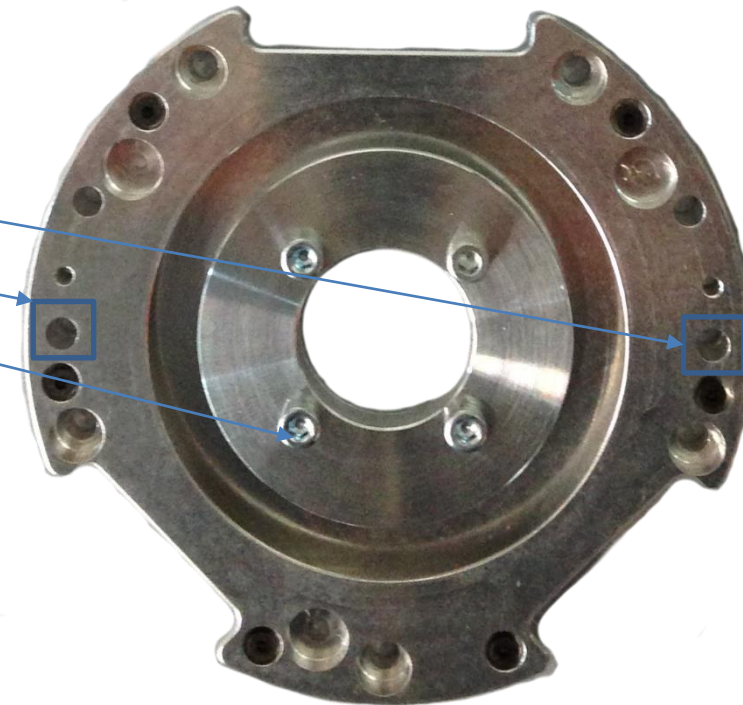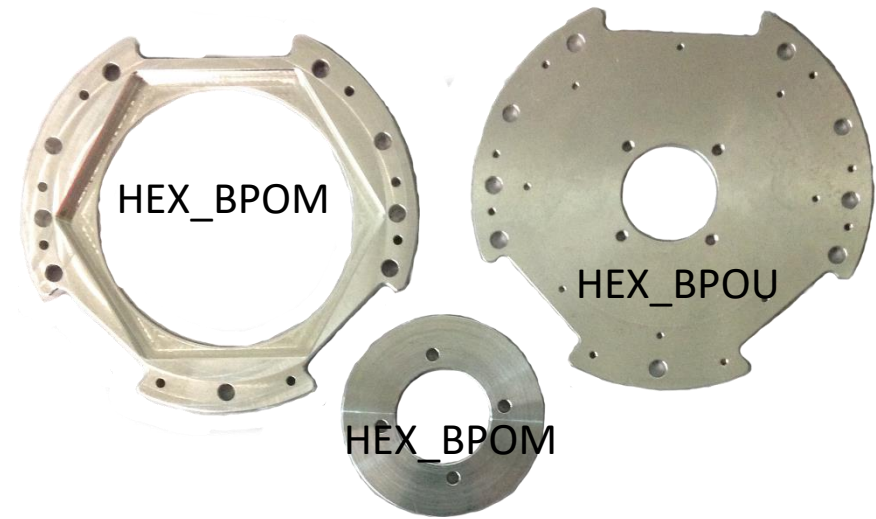- Silicon (e.g. Dragon skin shore 30A)
- Release Agent

TDC_NECK_BPOO

TDC_NECK_BPOU

TDC_NECK_BPOM

Assembly interface plate

Tools:

- Allenkey
- Parallel plyers

Instructions:

- Clean all parts using iso-propanol
- Pair HEX_BPOO and HEX_BPOU by the dowel pins using the parallel plyers
- Pair HEX_BPOO and HEX_BPOU with 6x M2x6 using an allenkey
- Pair HEX_BPOU and HEX_BPOM with 4x M3x8 using an allenkey
- Repeat all steps for 2nd interface plate
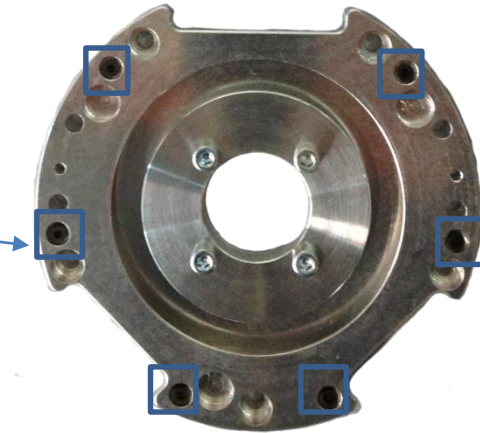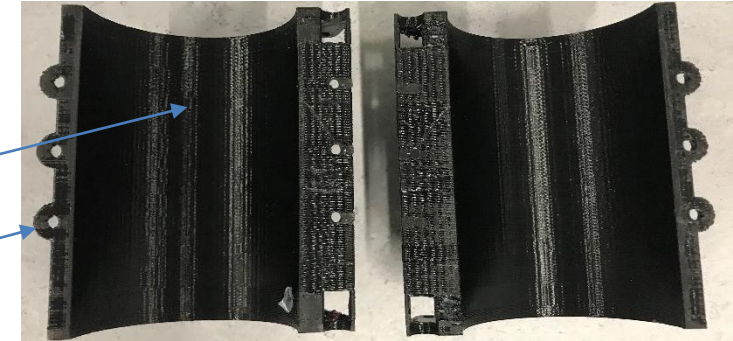
HEX_BPOM

HEX_BPOU

HEX_BPOM

Assembly of interface plate and moldings

Tools:

- Allenkey

Instructions:

- Cover the inside of the molds with the release agent
- Pair the two molds with each other using 6x M3x8 and corresponding nuts
- Pair the molds and the lower and upper interface plate using screws 2x6x M2x12

Instructions for moldings

Tools

- Vacuum pump
- Container for to mix 2-component silicon & Stirring staff
- Digital scale

Parts:

- Assembled interface plates with moldings
- 3D-printed Funnel

Instructions

- Mix 2 component silicon in container at the correct ratio (using the scale) with the stirring staff.
- Evacuate the mixture by a vacuum pump to remove air-bubbles with the mixture
- Pure the evacuated mixture into the assembled moldings using the funnel
- Let it cure for the respective time (24h for dragon skin)
- Remove the molds
- Pair HEX_BPOO and HEX_BPOU with 2x 6x M2x6 using an allenkey