

Update status for the 4 m straw with spacers inserted

GTU-STT Group

N. Tsverava

D. Chokheli

G. Adamov

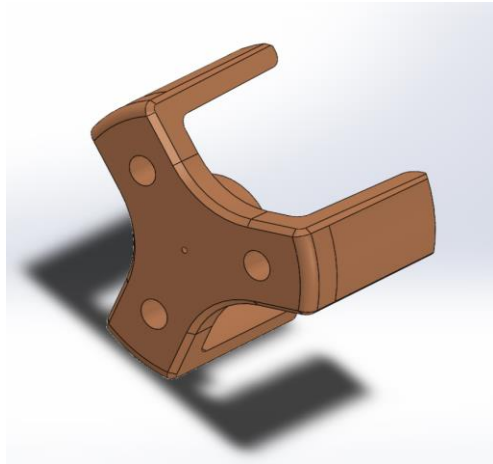
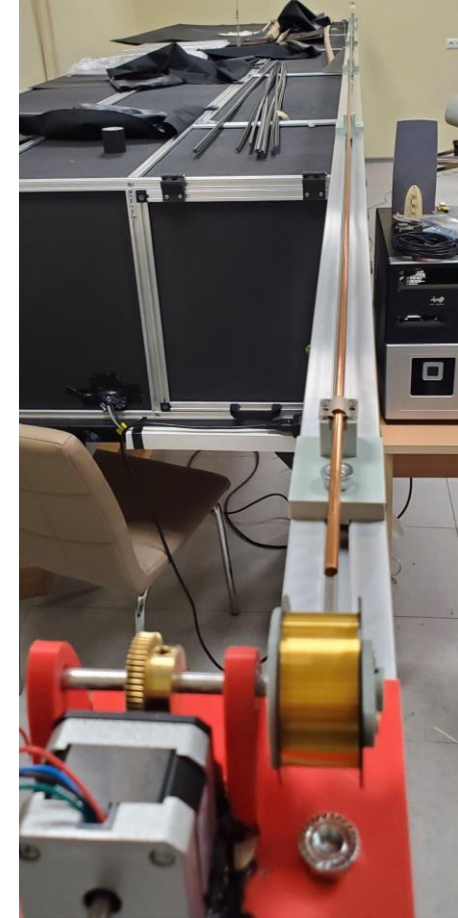
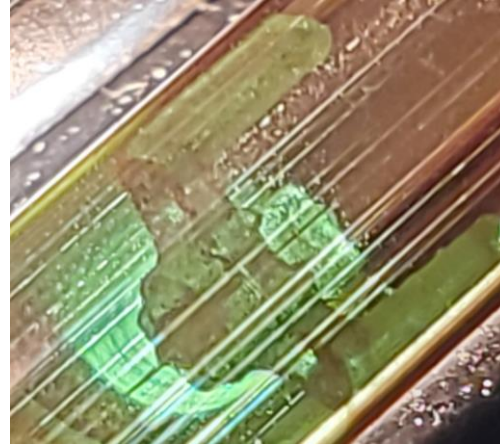
Two method to insert spacers into the straw

- **First:** the straw tube is fixed, and the wire with spacers are moving through the straw.
- **Second:** on the contrary, when the wire and spacers are fixed and straw moving relative to them. **Contactless inserting:** special tools are using for it



Some words about spacers

- The design of the provided spacer has been upgraded by **Ilya Chokheli** so that it can be able print it out on UV printer
- 100 um central hole by model
- 4.95 mm of outer circle (needs to be re-checked using proper microscope)



Original spacer design

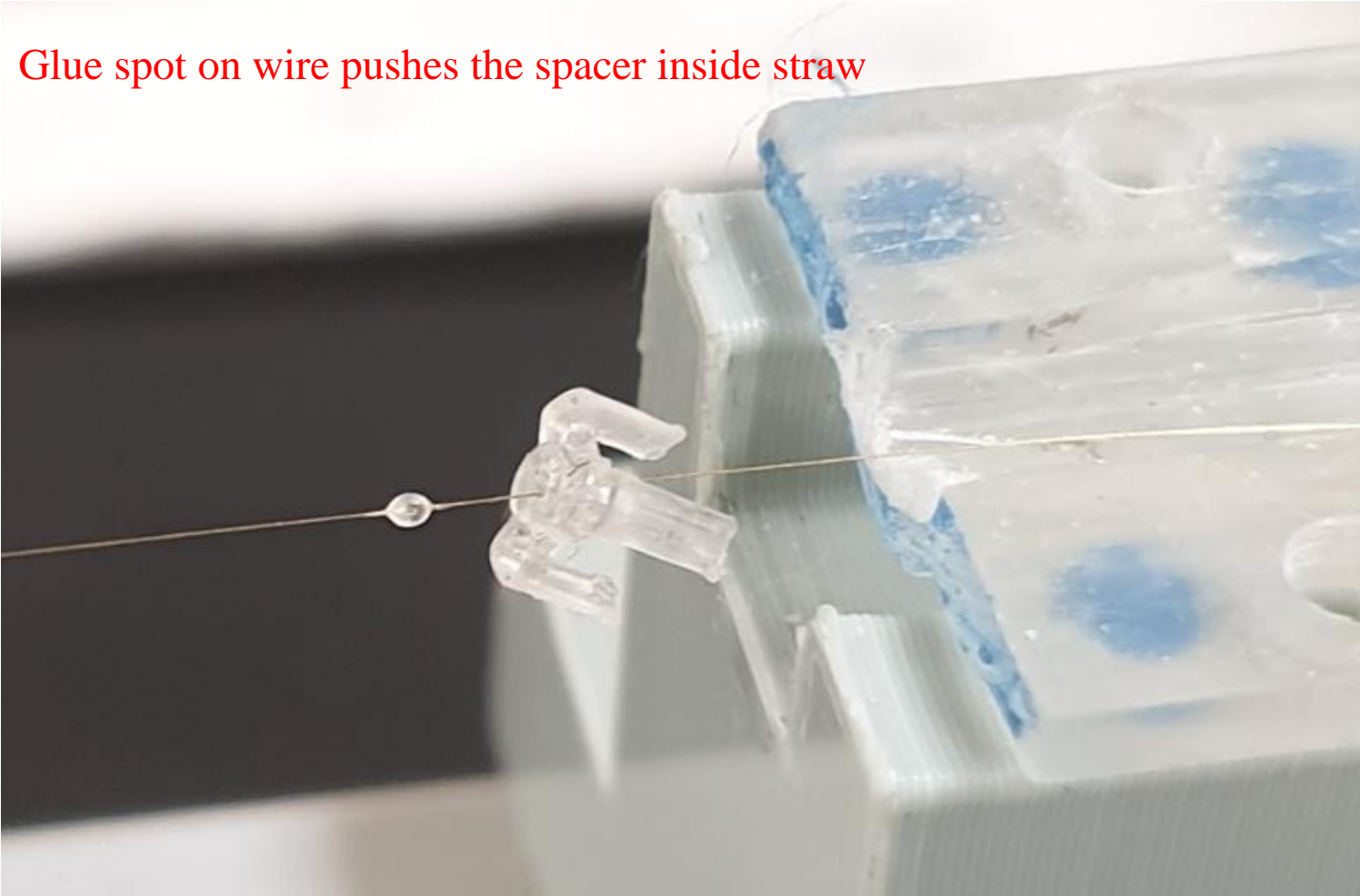


Upgraded by Ilya Chokheli design

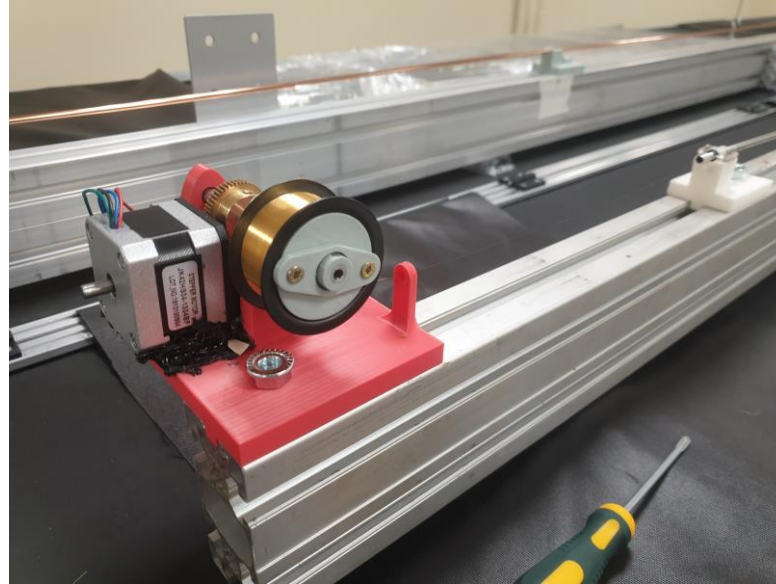
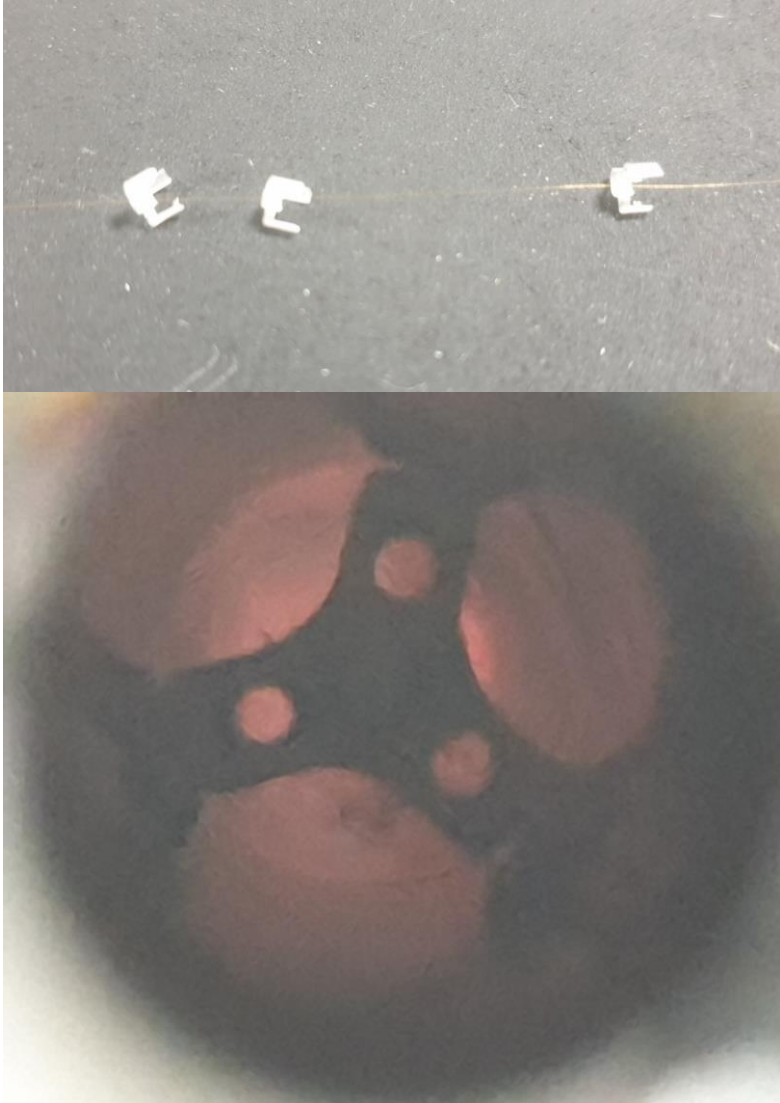


3D Printed spacers inserted in straw tube

Preparing wire with spacers for inserting, spacers are never glued on wire: remain free



Spacer installing process



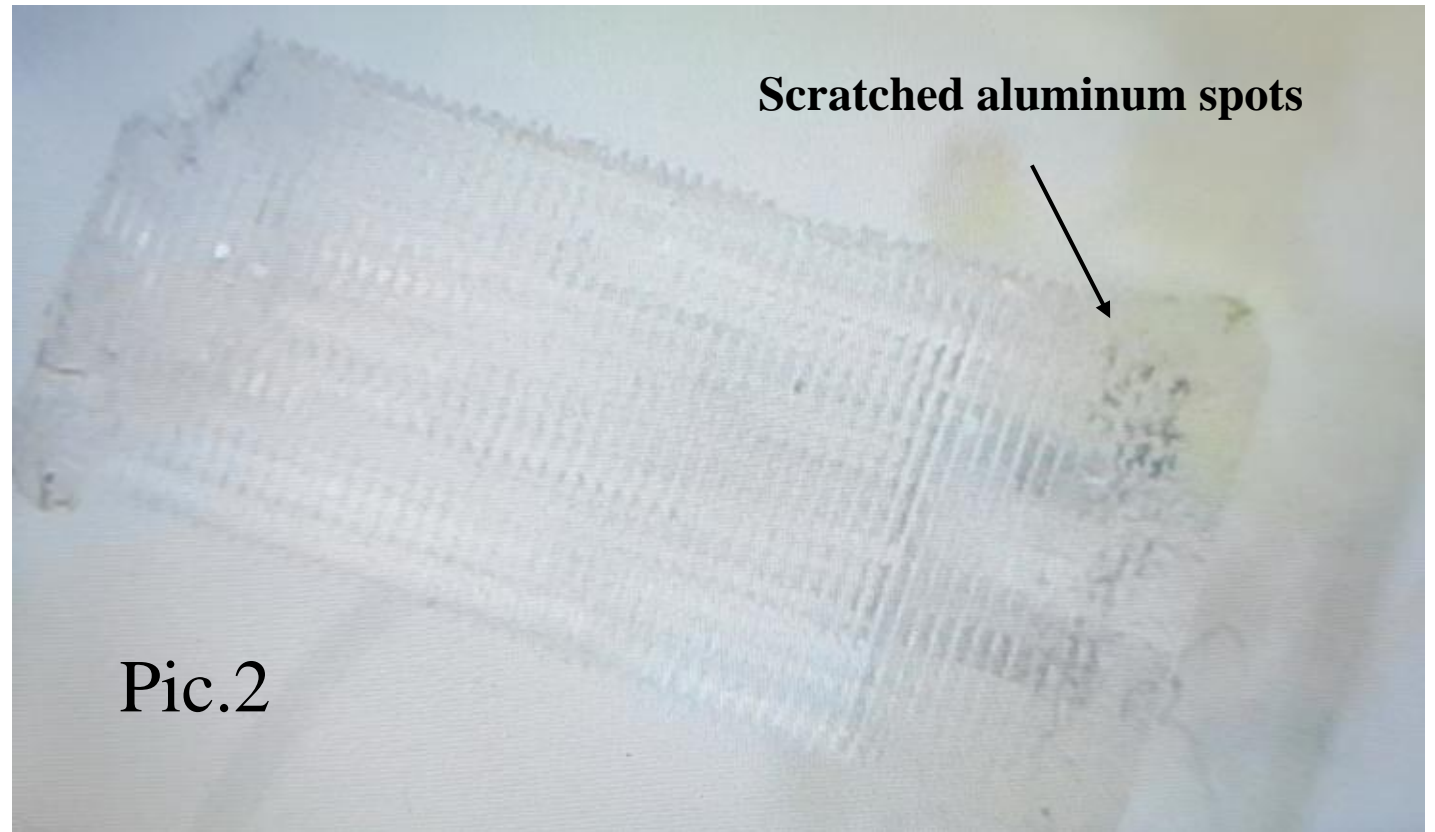
- For successful installing need:**
High precision spacer geometry with smooth surfaces for better slide
- Solved issues:**
- We optimized pulling speed
 - Changing glue



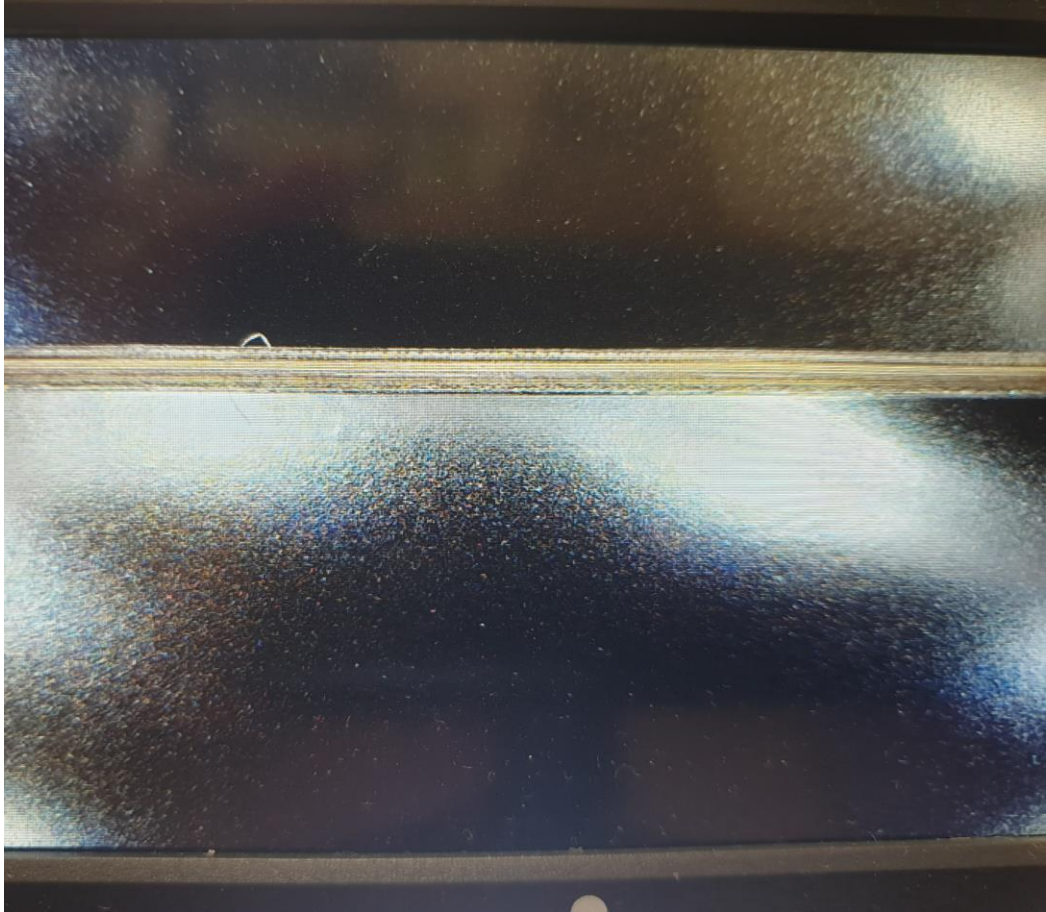
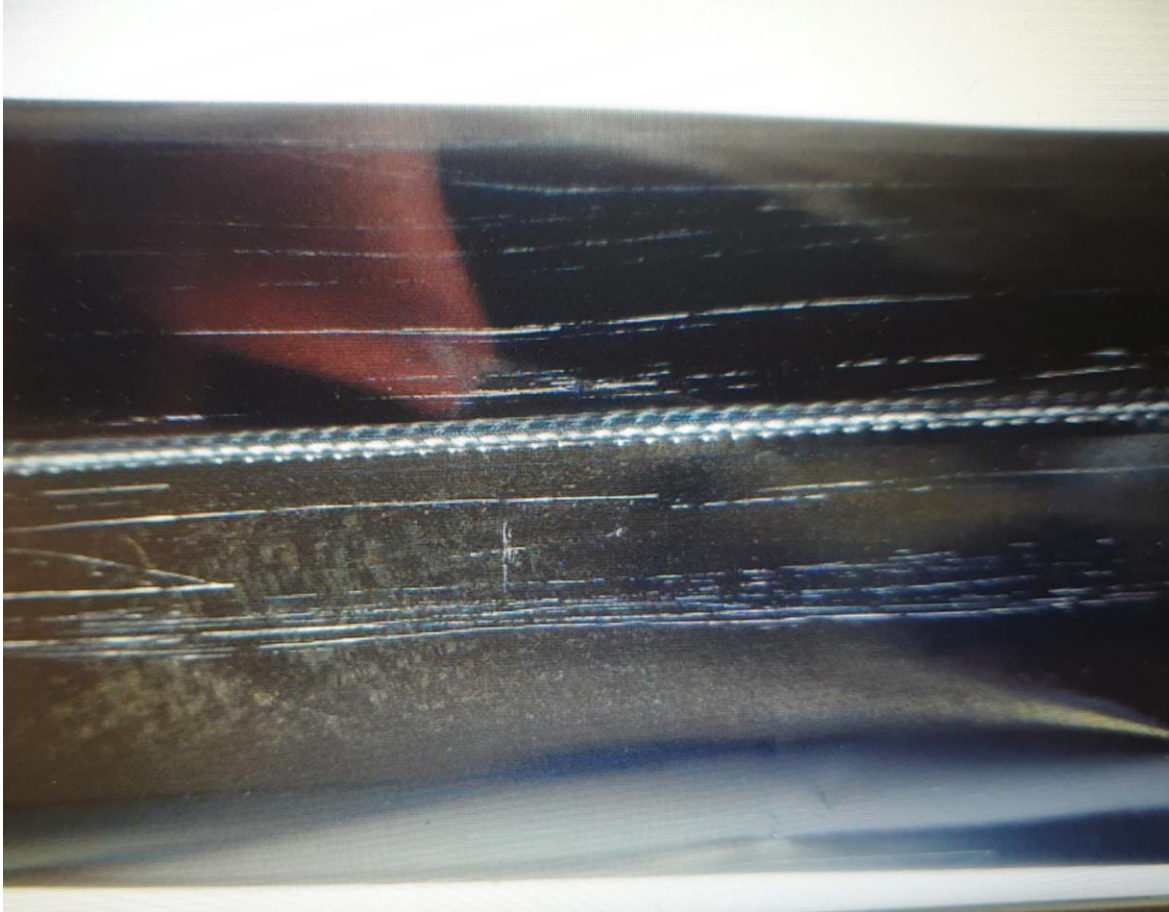
Pic.1 The straw is cut along the length after spacers inserted

Pic.2 3D Printed Spacer rib/leg view in microscope

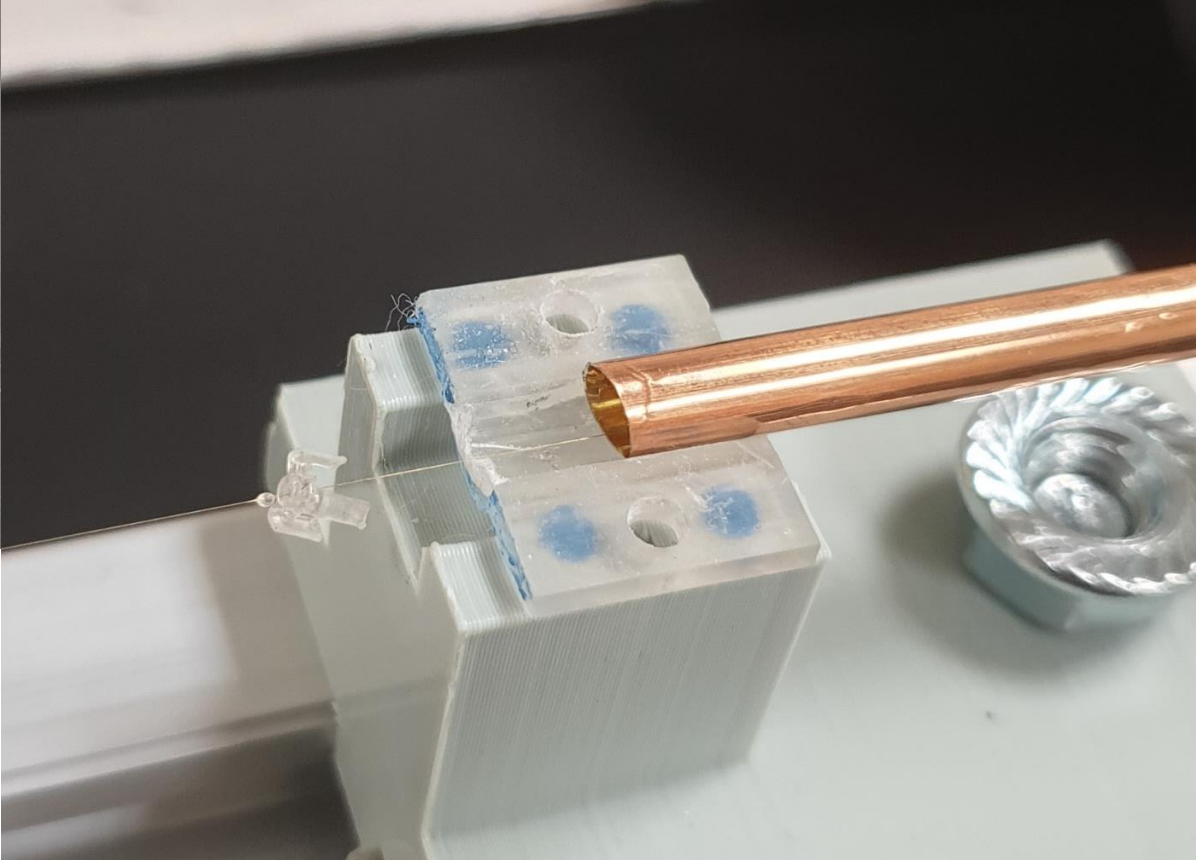
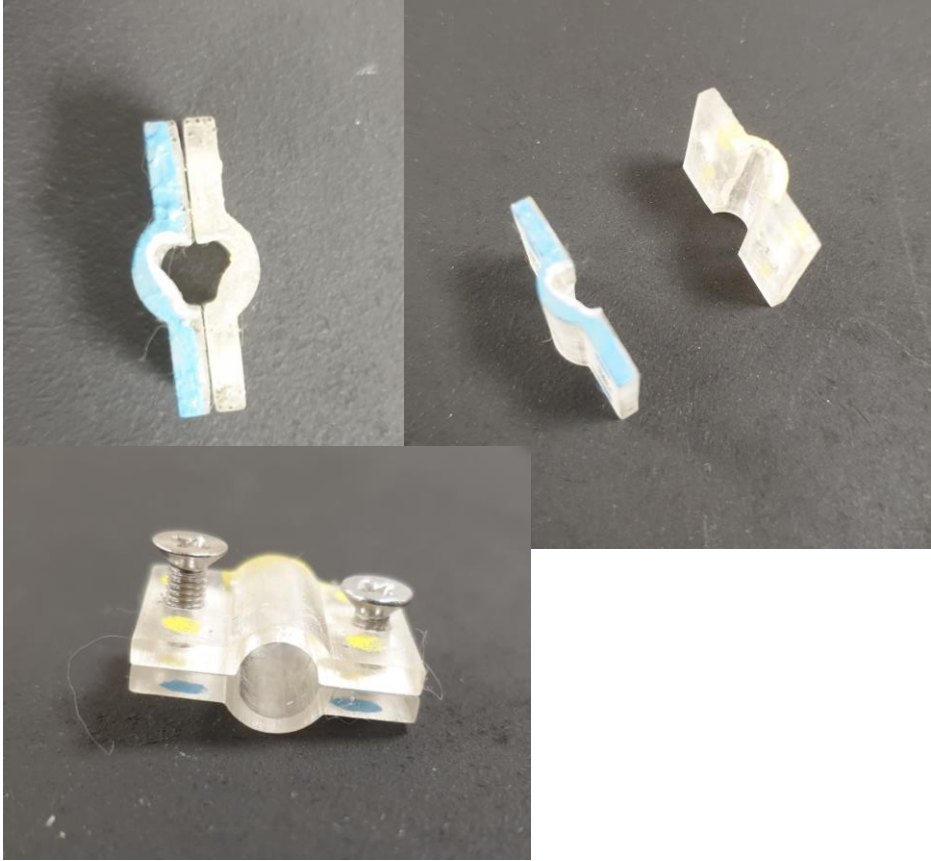
Pic.3 Straw inner surface after installation spacers using **First method**



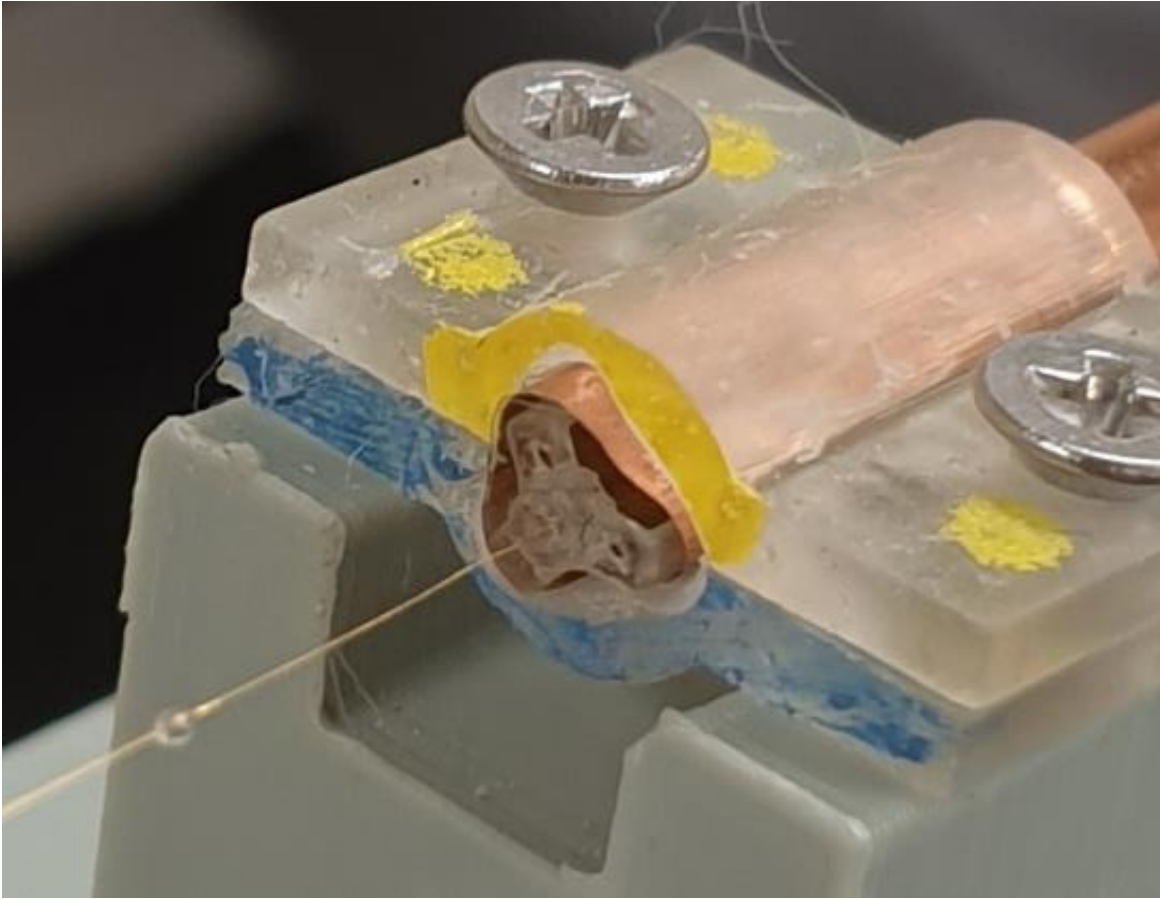
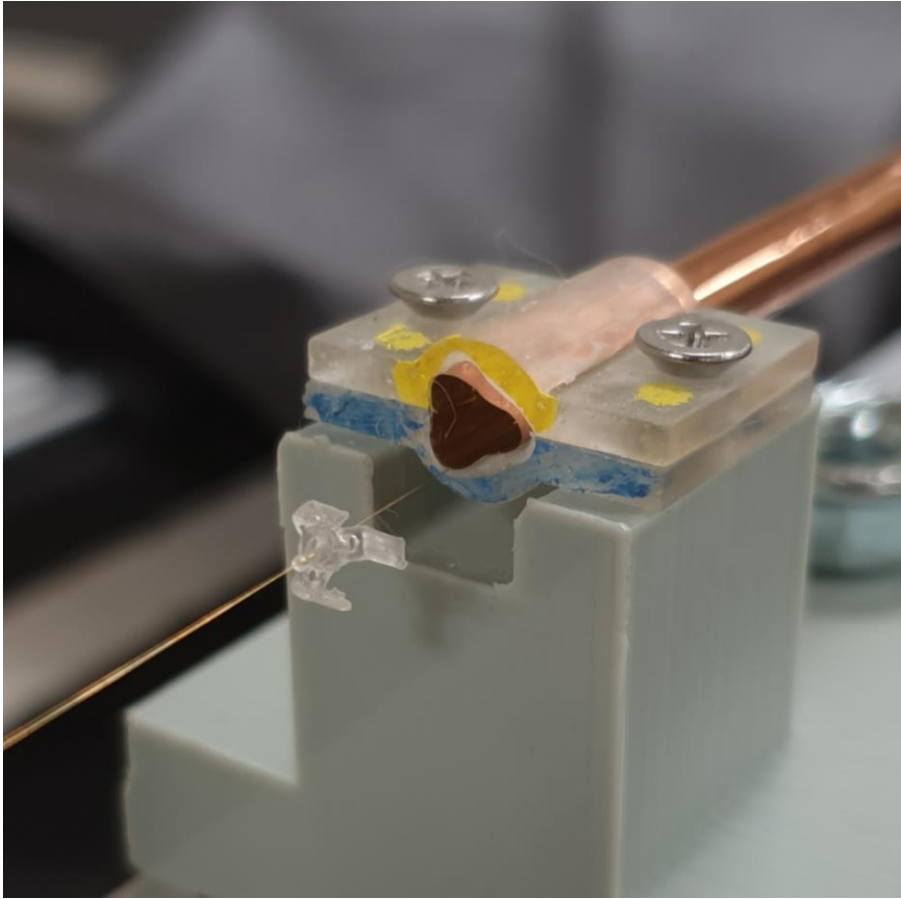
Straw inner surface before and after spacers installation



Using a straw tube former for contactless spacer installation



Tooling cross-section



Conclusion

- 3 spacers are successfully inserted into 4 m long straws in 1 m step.
- 2 methods for installing spacers have been developed: both methods work
- Special setups are created for this task and insertion of spacers can be done in horizontal position
- First method avoid scratching the surface, but requires inserting spacers in advance before final installation
- In contrast, the second method can be used after gluing the straws, but it leaves scratches on the inside surface
- To avoid it, we need high-quality and precisely molded spacers

Thank you for your attention