



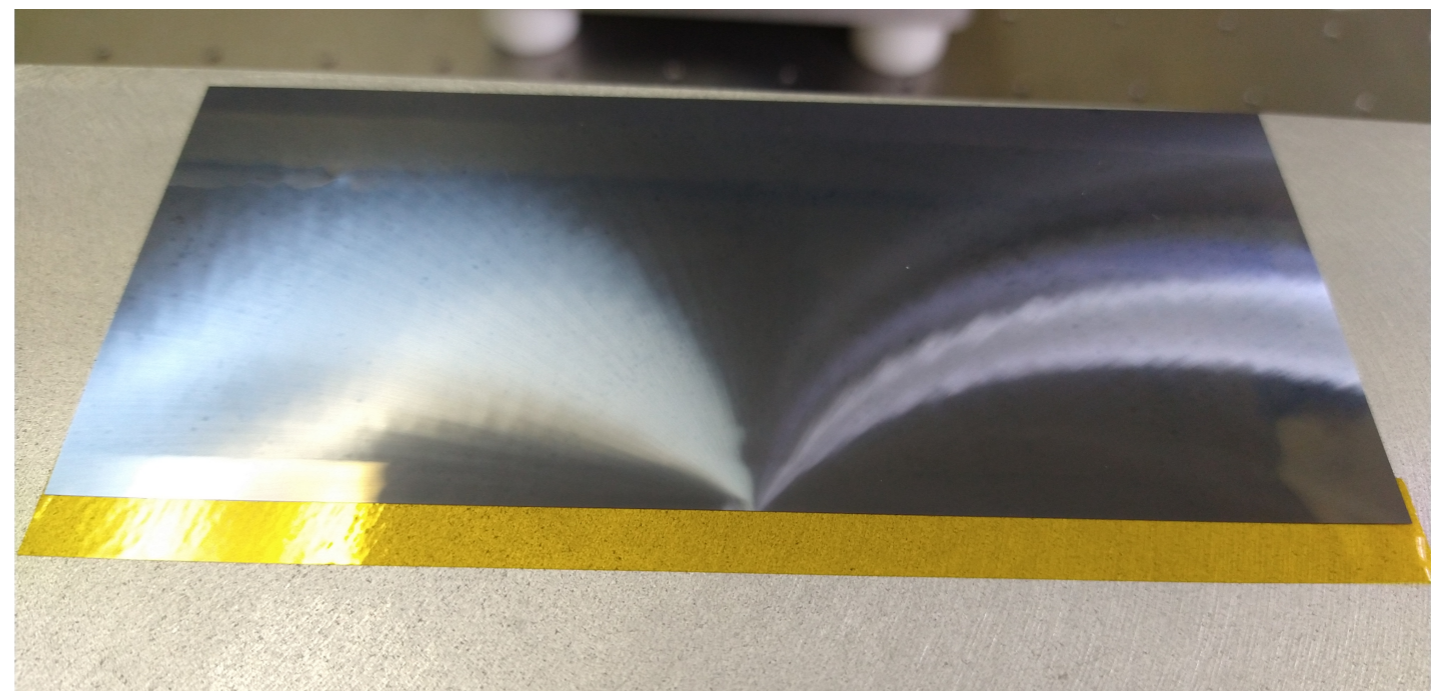
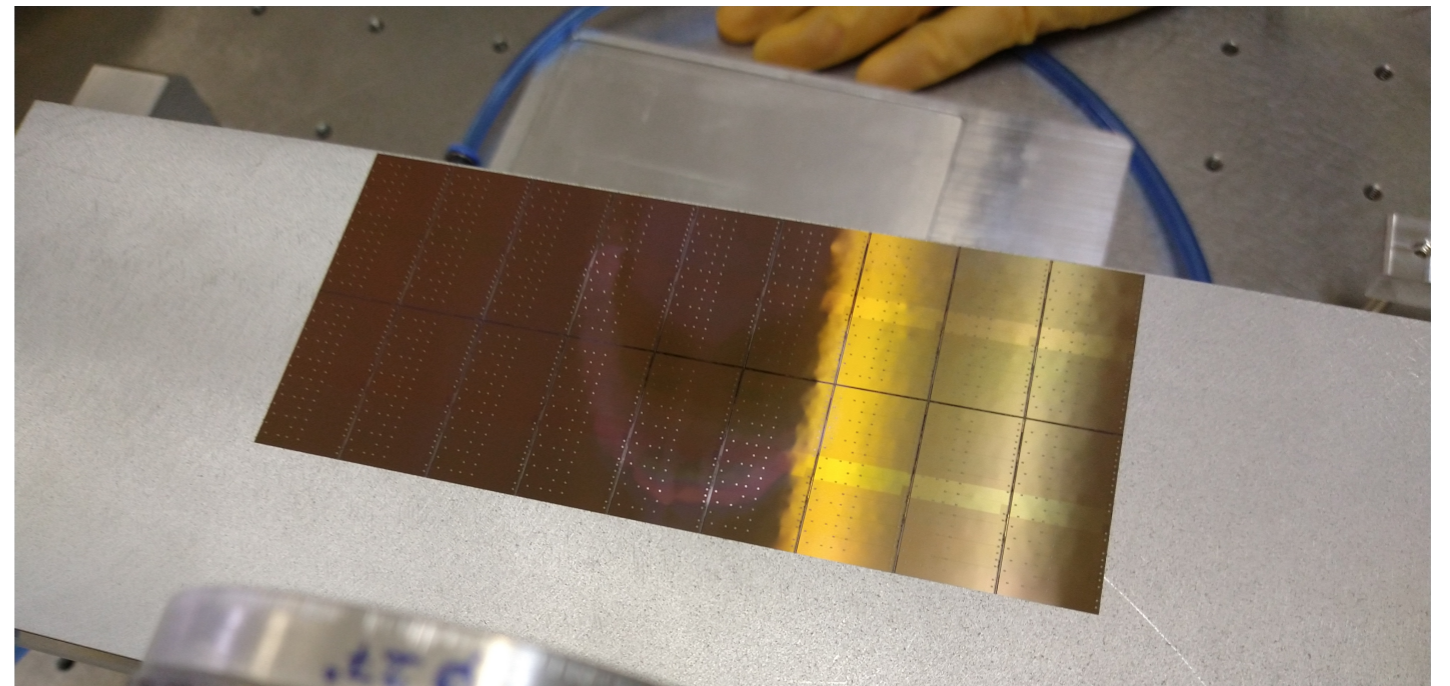
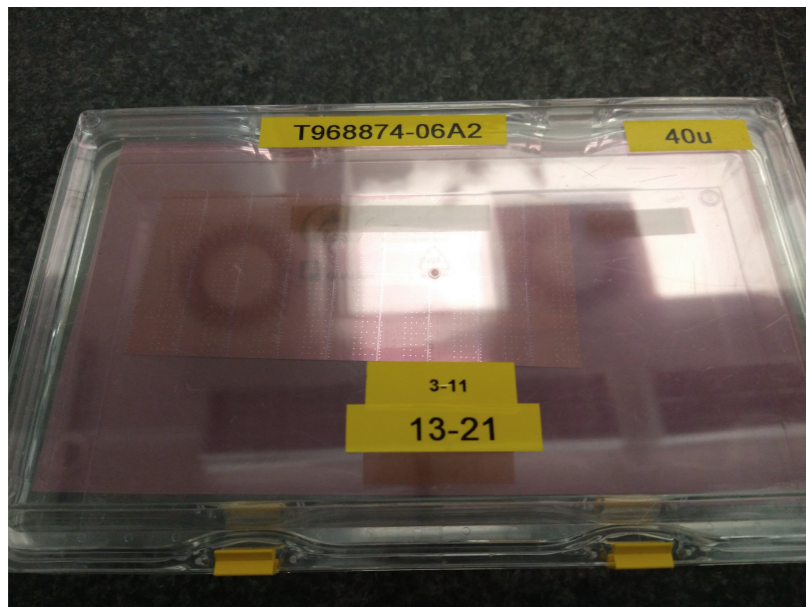
ITS3 activities in Bari

Toward the first working super-ALPIDE

1. Sensor bending → **DONE**
2. Edge-FPC bonding → **DONE**
3. Support structures gluing → **CHIP BROKEN**
4. Exo-FPC bonding → NOT DONE

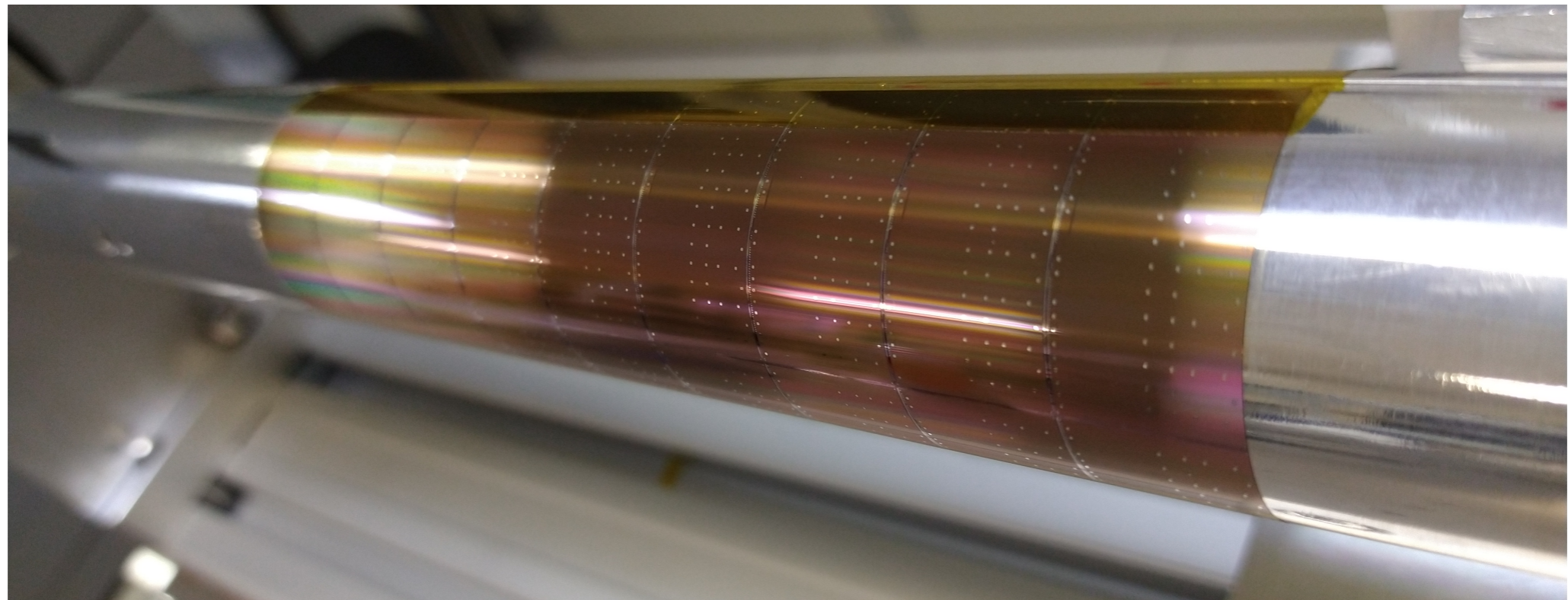
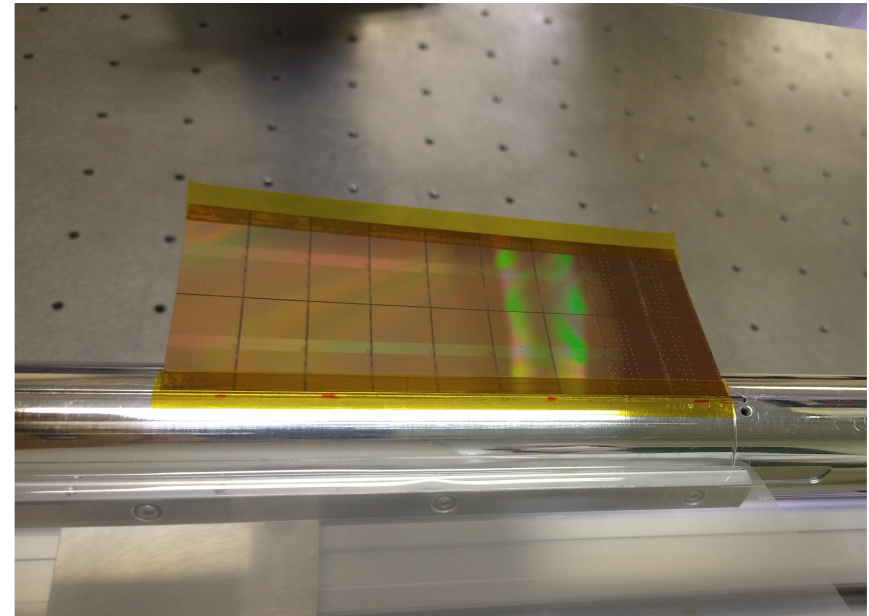
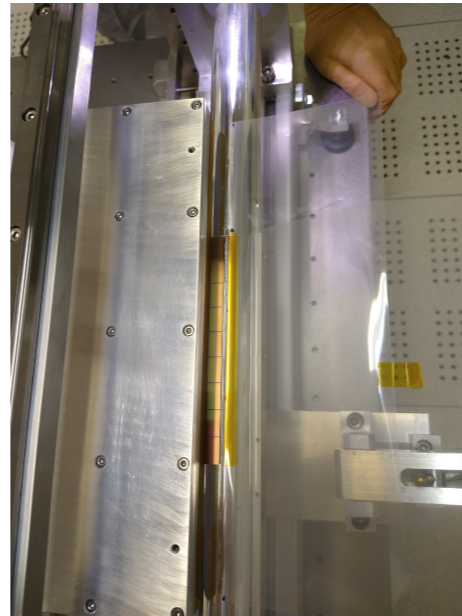
1. Sensor bending
2. Edge-FPC bonding
3. Support structures gluing
4. Exo-FPC bonding

40 μm sensor

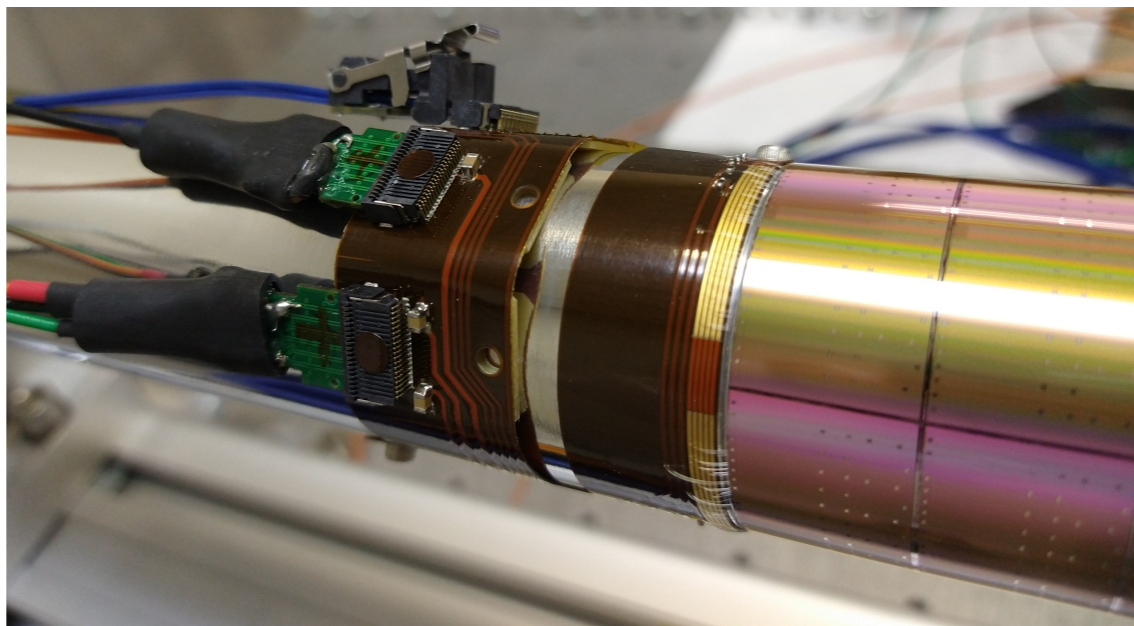
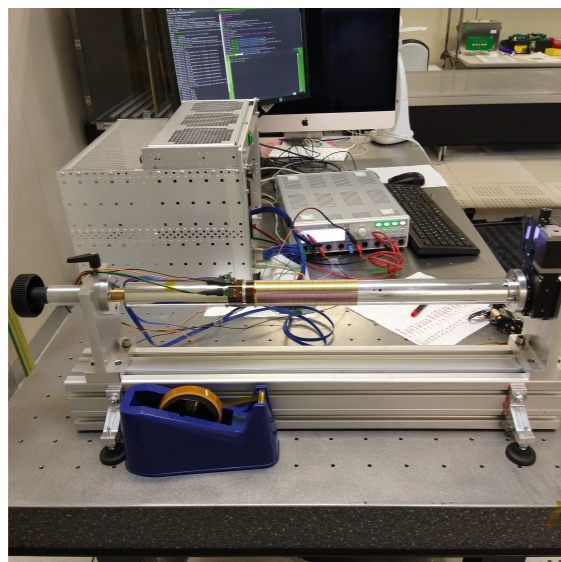
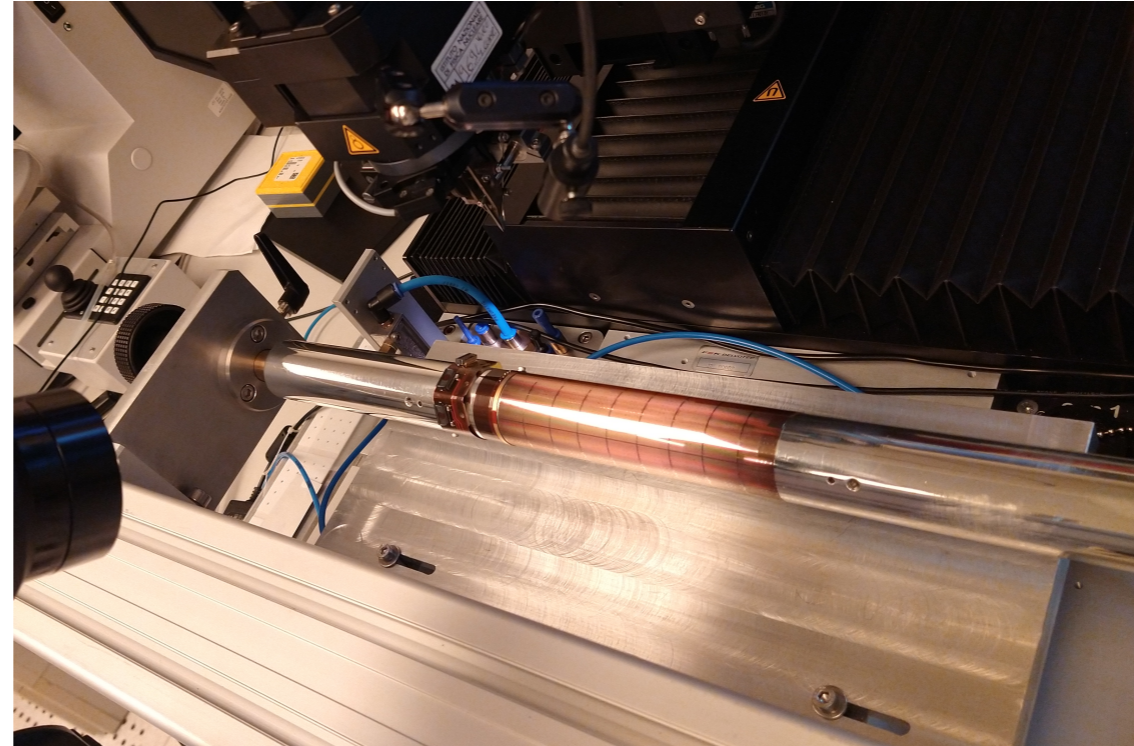
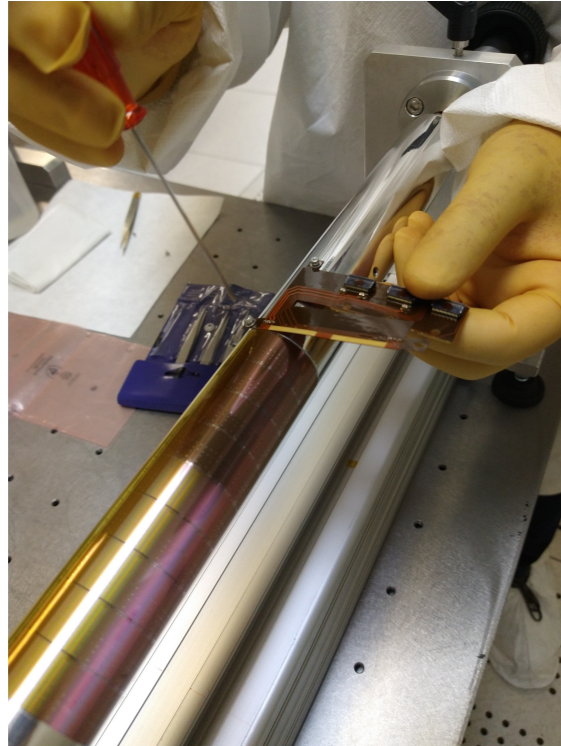


27/10/2022 - Week 43

1. Sensor bending
2. Edge-FPC bonding
3. Support structures gluing
4. Exo-FPC bonding

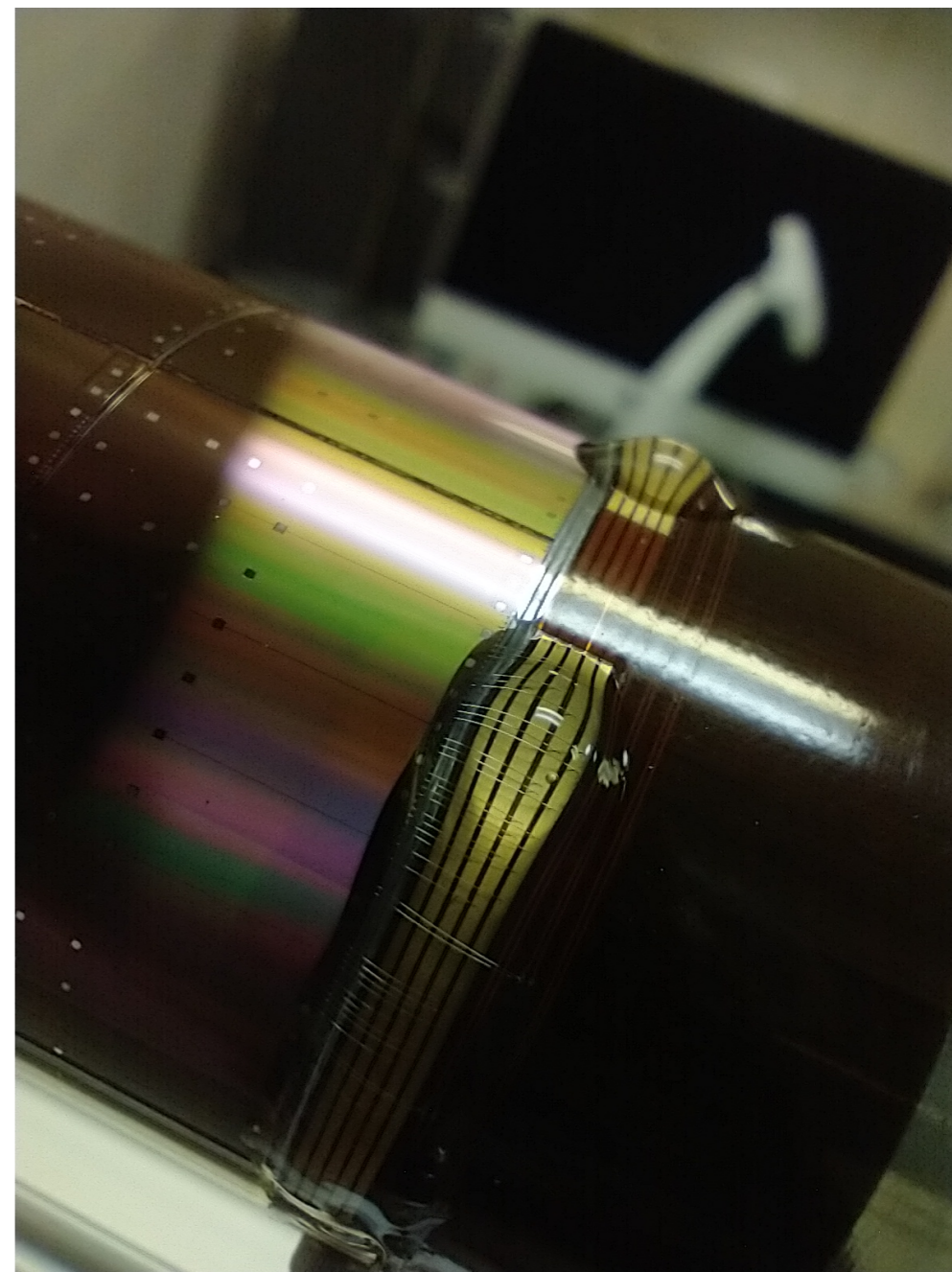
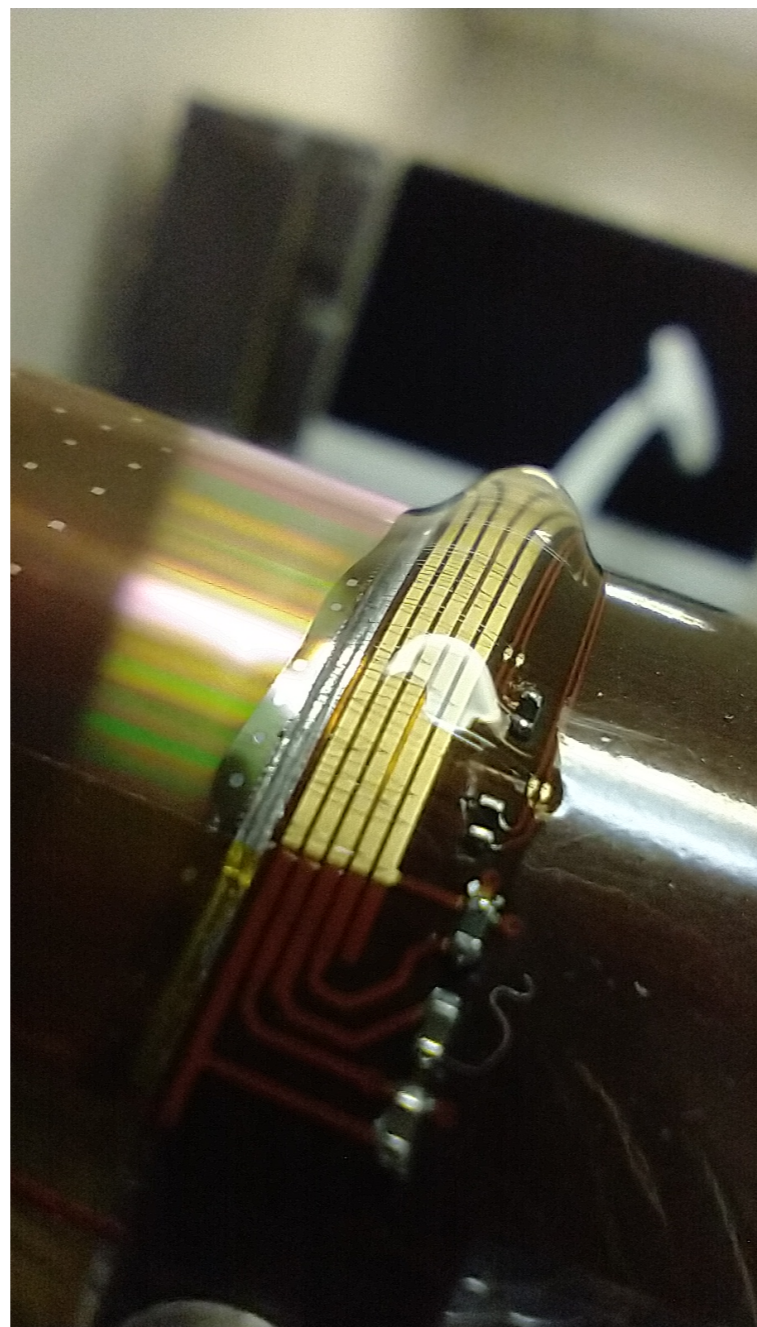
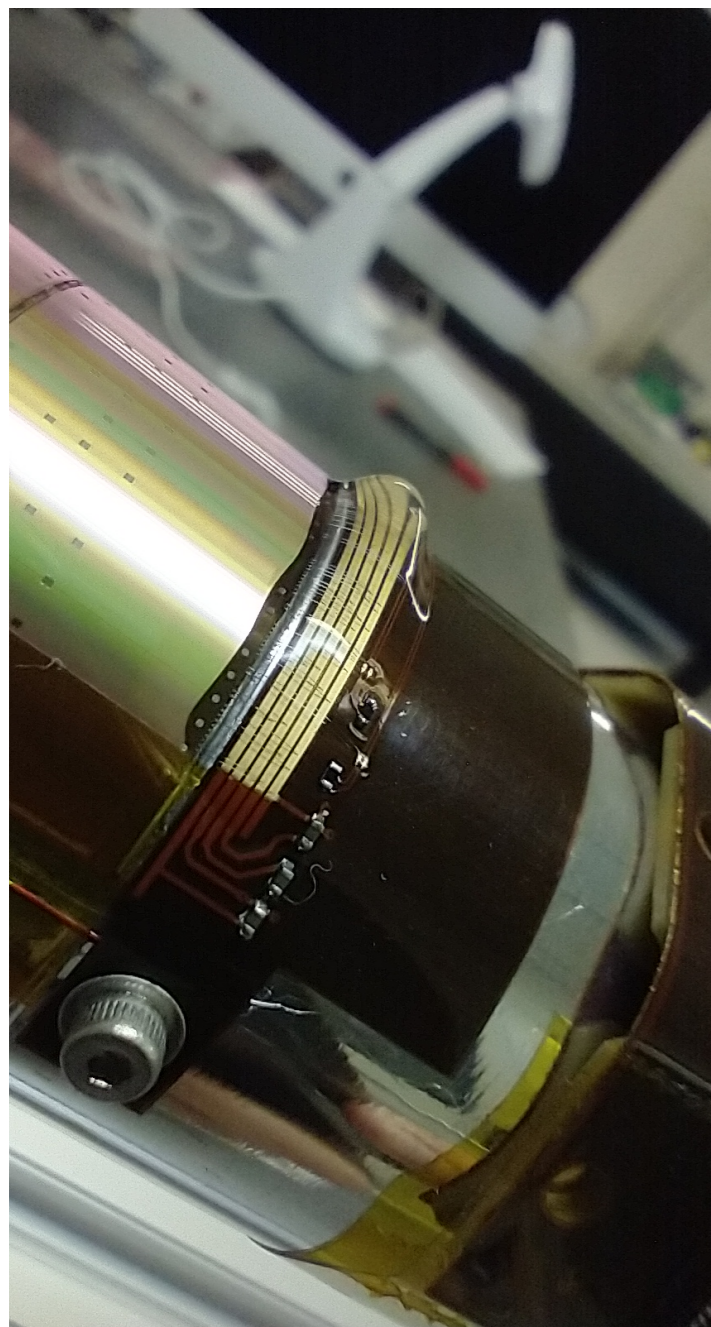


1. Sensor bending
2. Edge-FPC bonding
3. Support structures gluing
4. Exo-FPC bonding



1. Sensor bending
2. Edge-FPC bonding
3. Support structures gluing
4. Exo-FPC bonding

Wire-bonding encapsulation

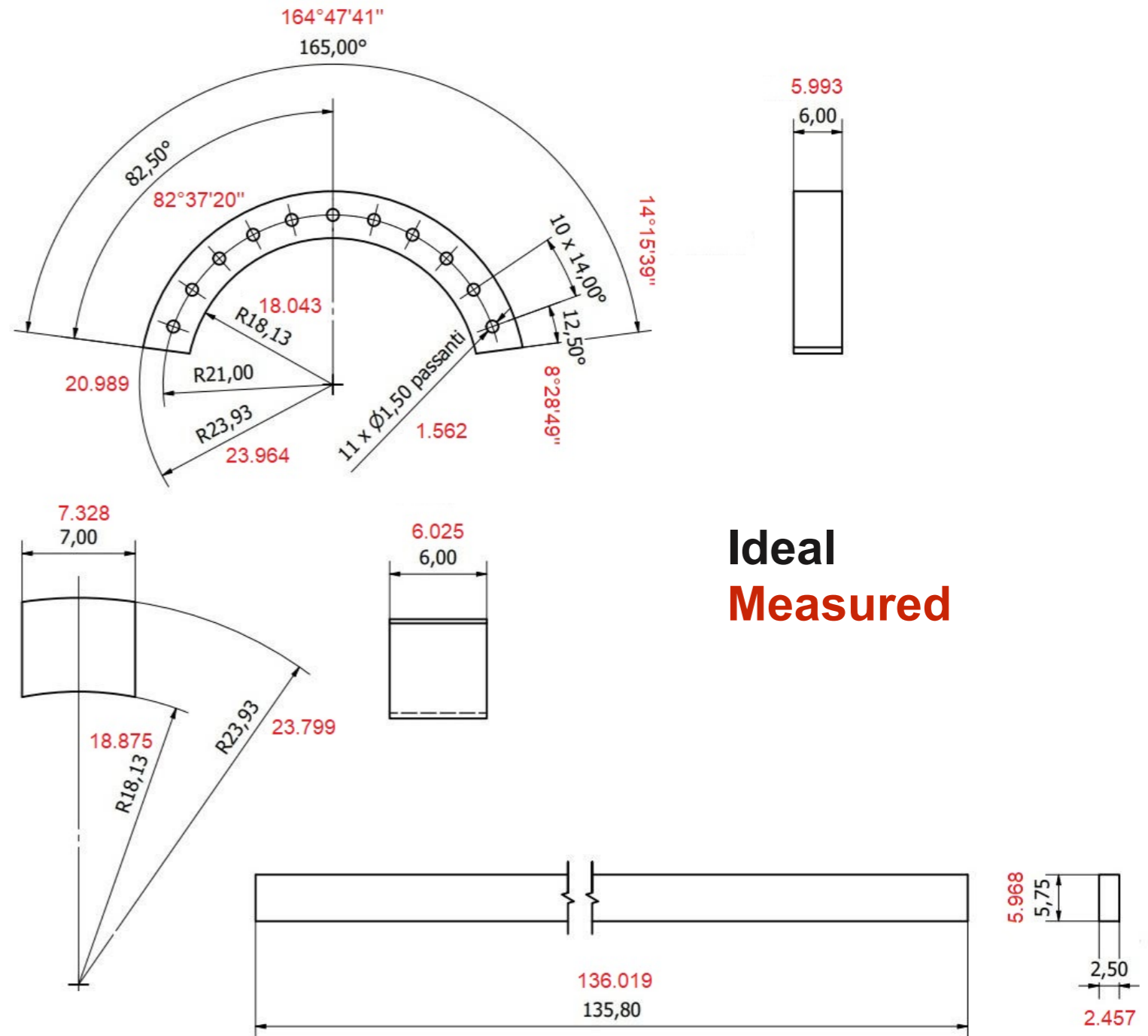


1. Sensor bending
2. Edge-FPC bonding
3. Support structures gluing
4. Exo-FPC bonding

Before gluing we performed dimensional check for:

- carbon foam wedge
- carbon foam longerons
- carbon foam half-ring
- 3d printed exoskeleton

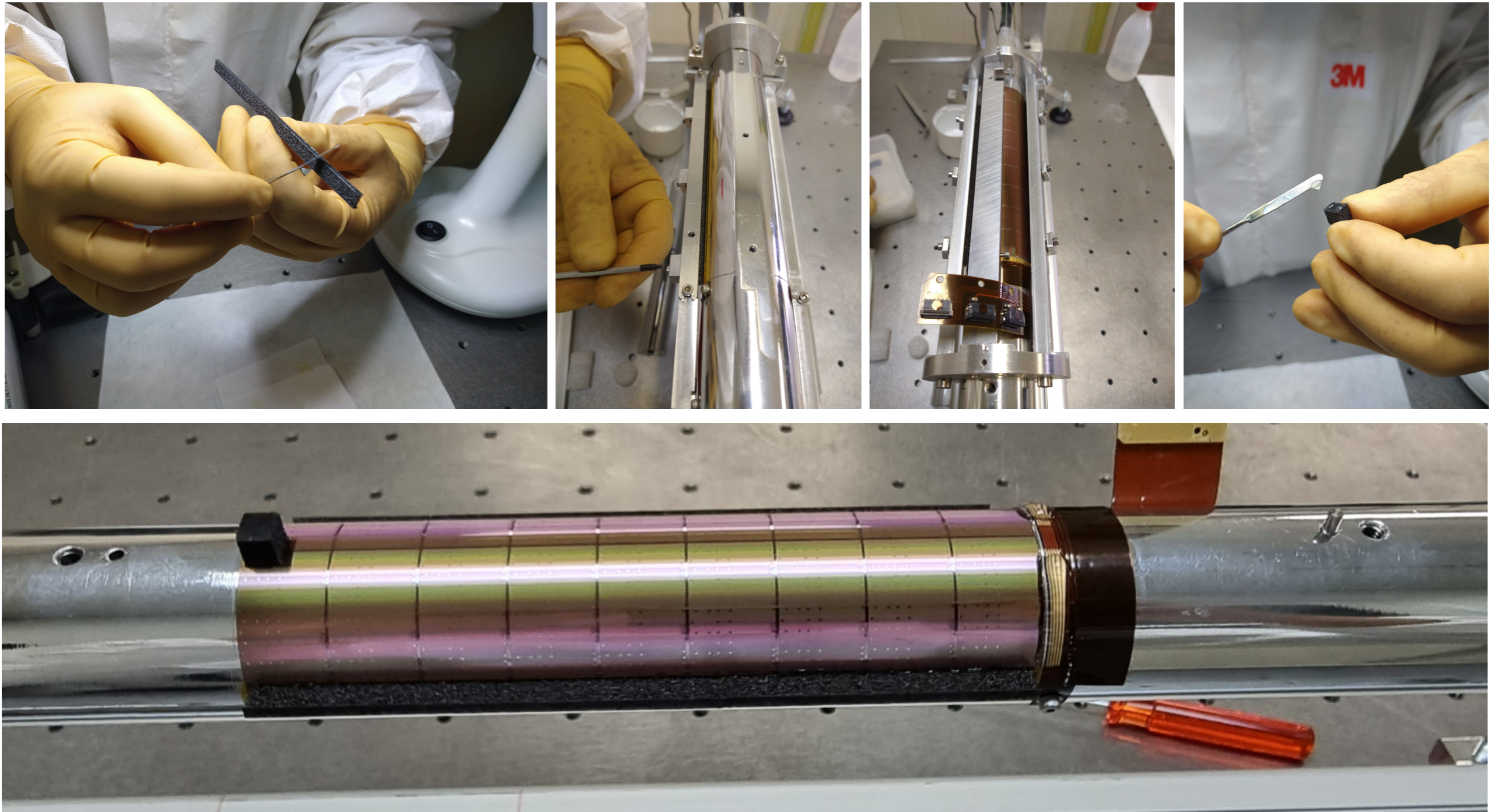
Carbon foam measurements have been done with optical tool and the reported values for the curvatures are the mean values over at least ten points along the full object length.



1. Sensor bending
2. Edge-FPC bonding
3. Support structures gluing
4. Exo-FPC bonding

Longerons and wedge

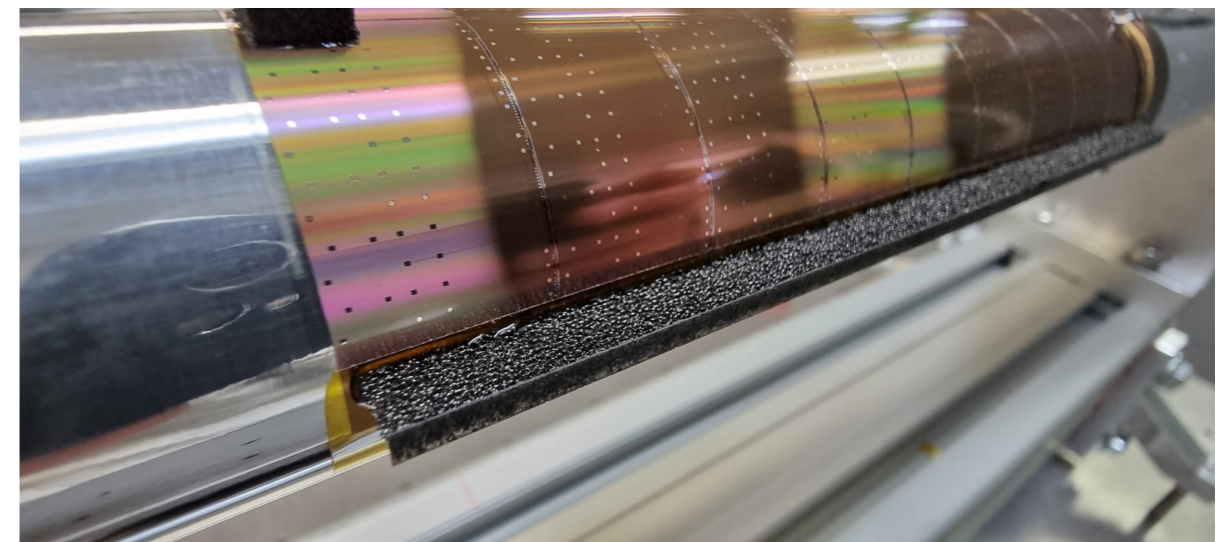
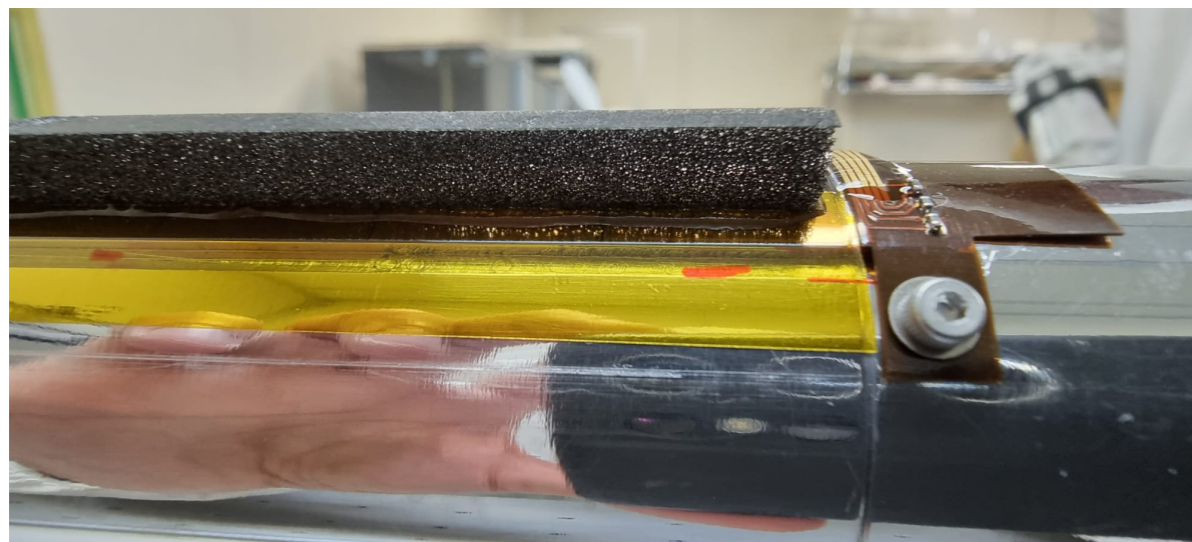
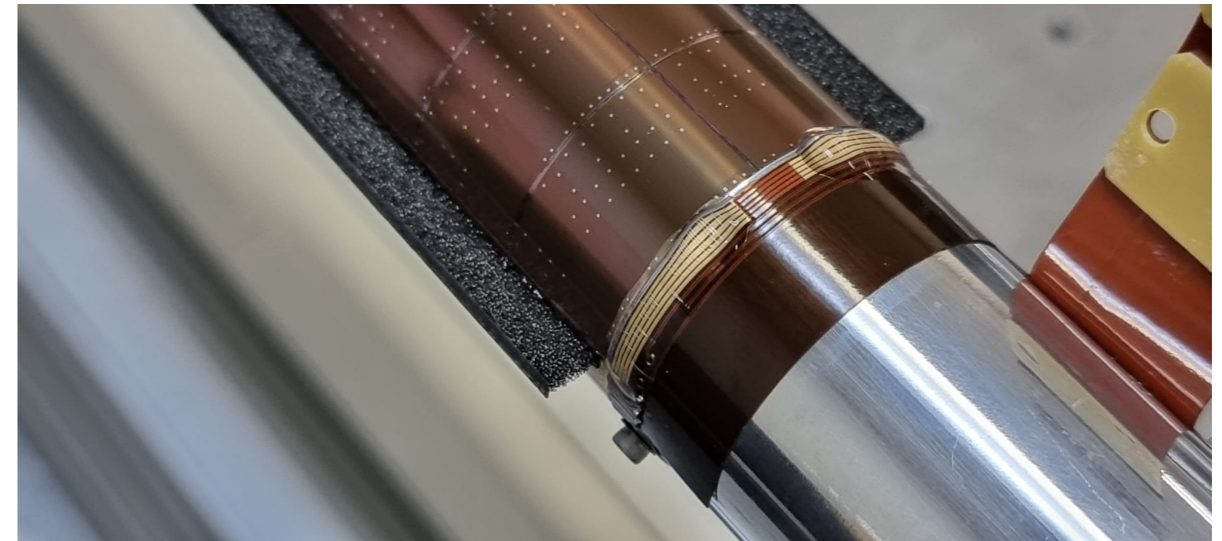
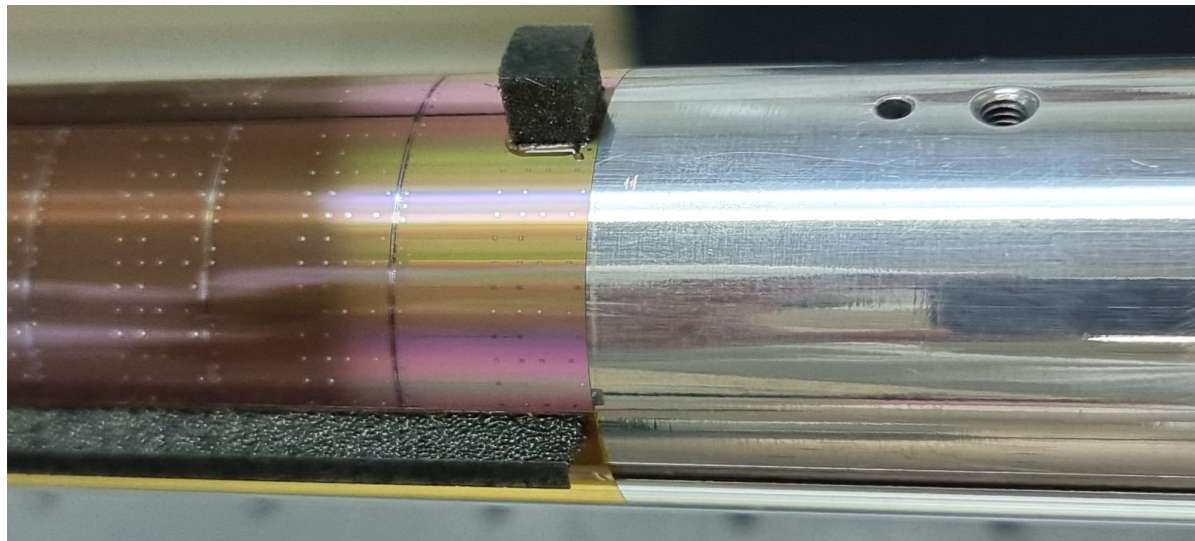
Glue: Araldite2011



1. Sensor bending
2. Edge-FPC bonding
3. Support structures gluing
4. Exo-FPC bonding

Longerons and wedge

Glue: Araldite2011



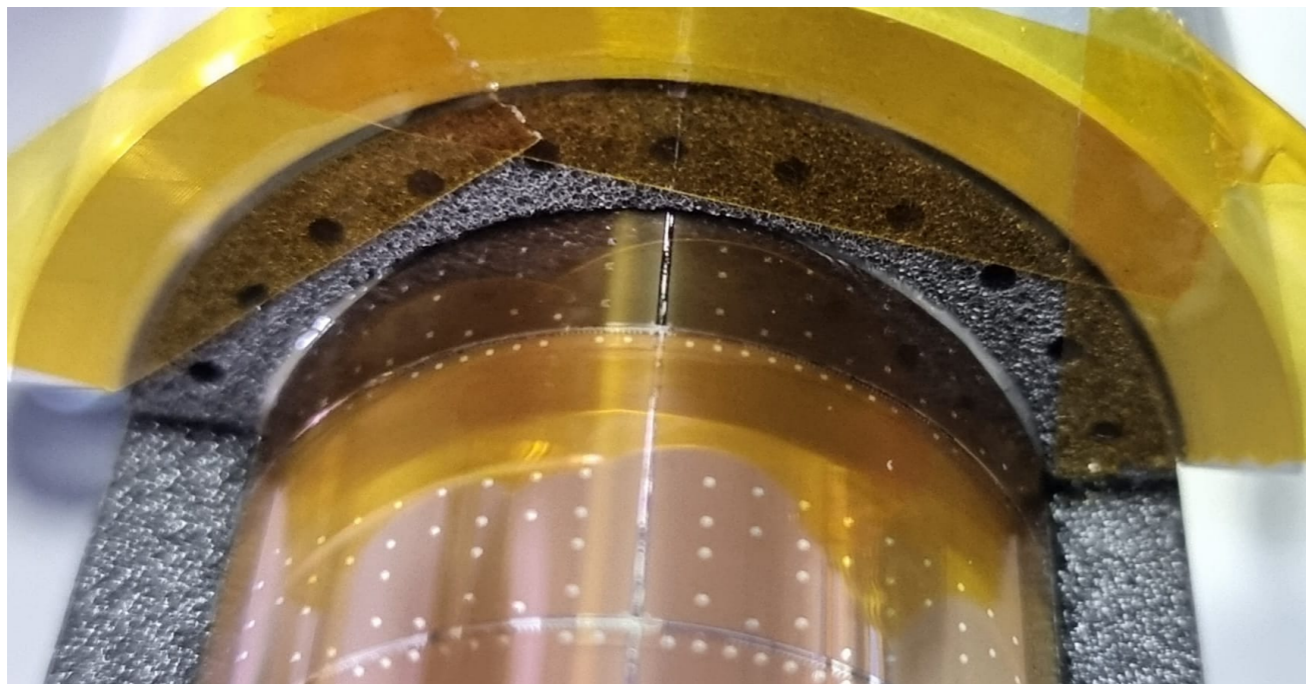
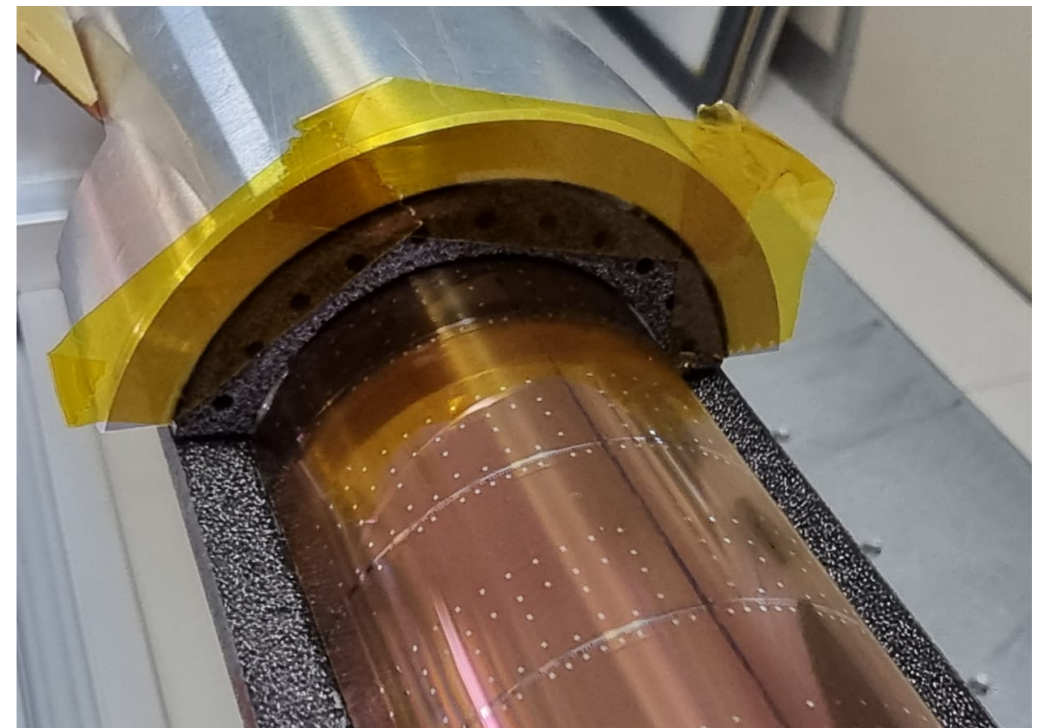
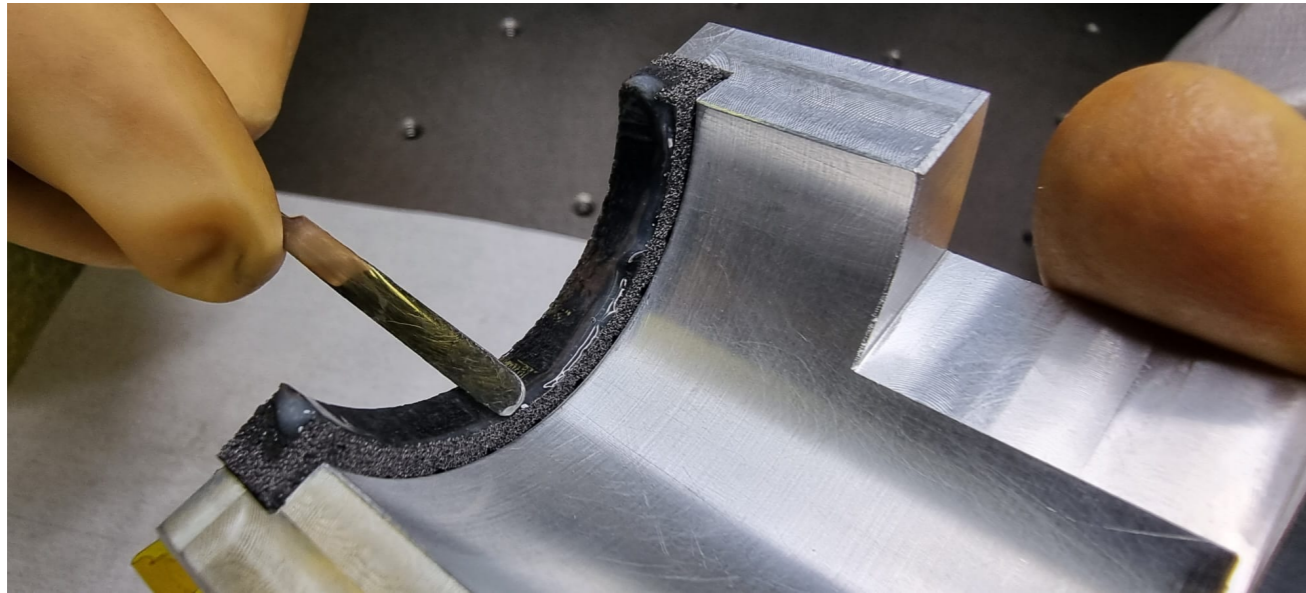
1. Sensor bending
2. Edge-FPC bonding
3. Support structures gluing
4. Exo-FPC bonding

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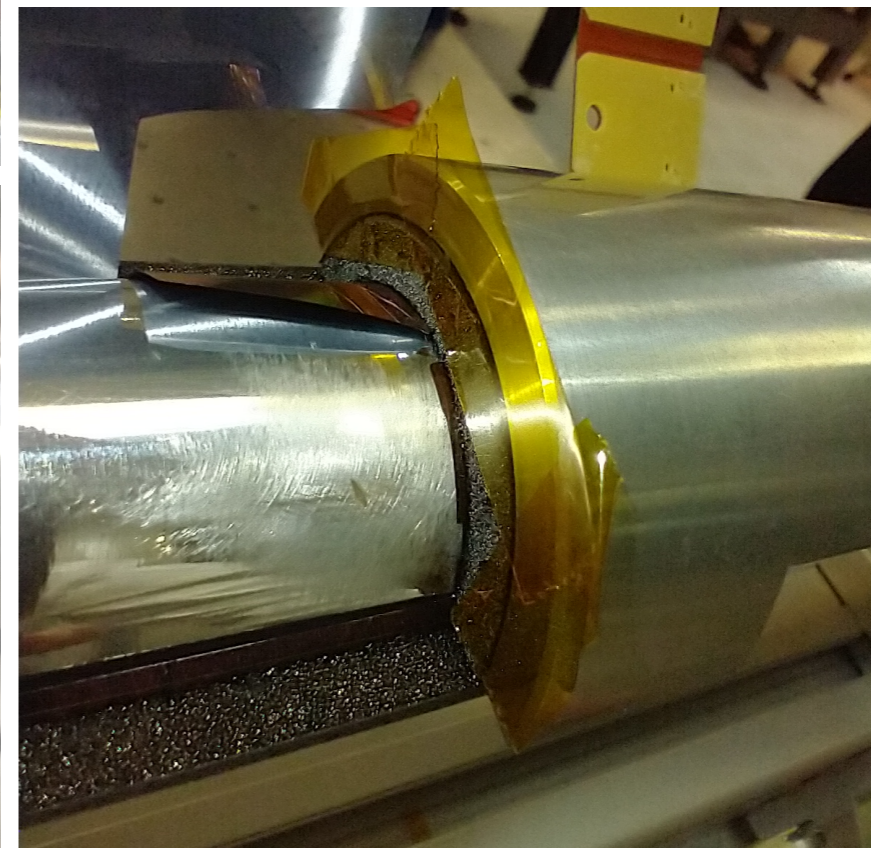
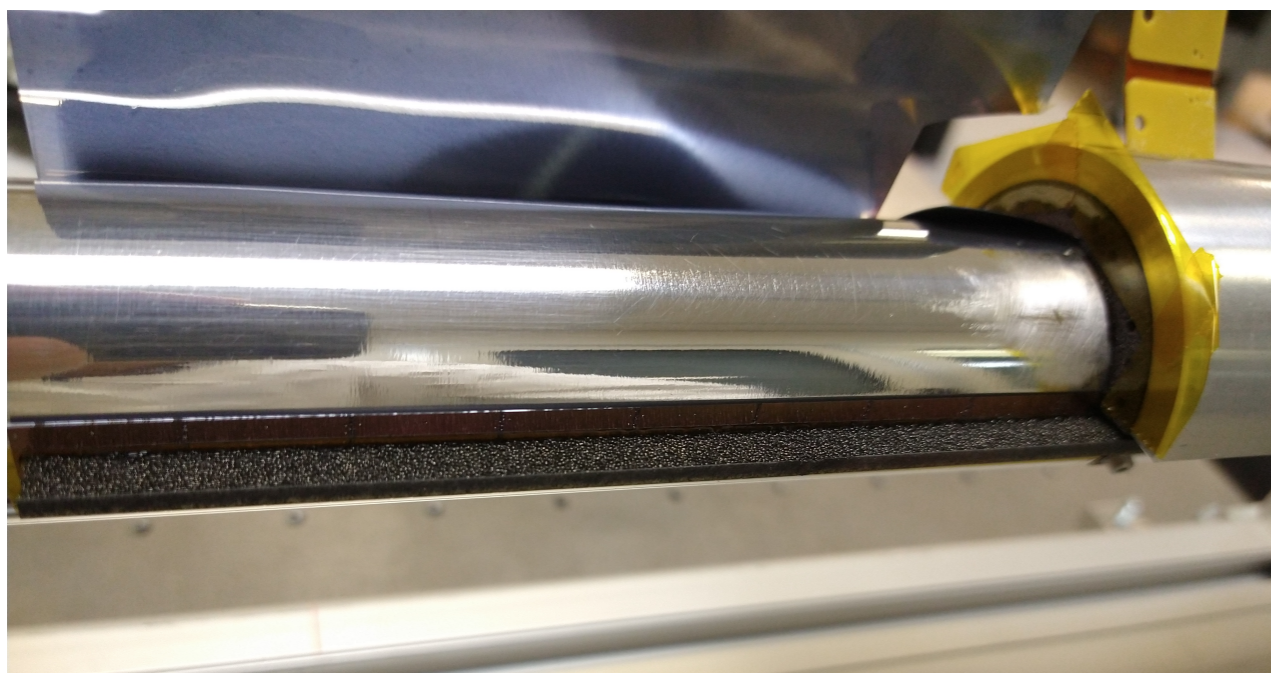
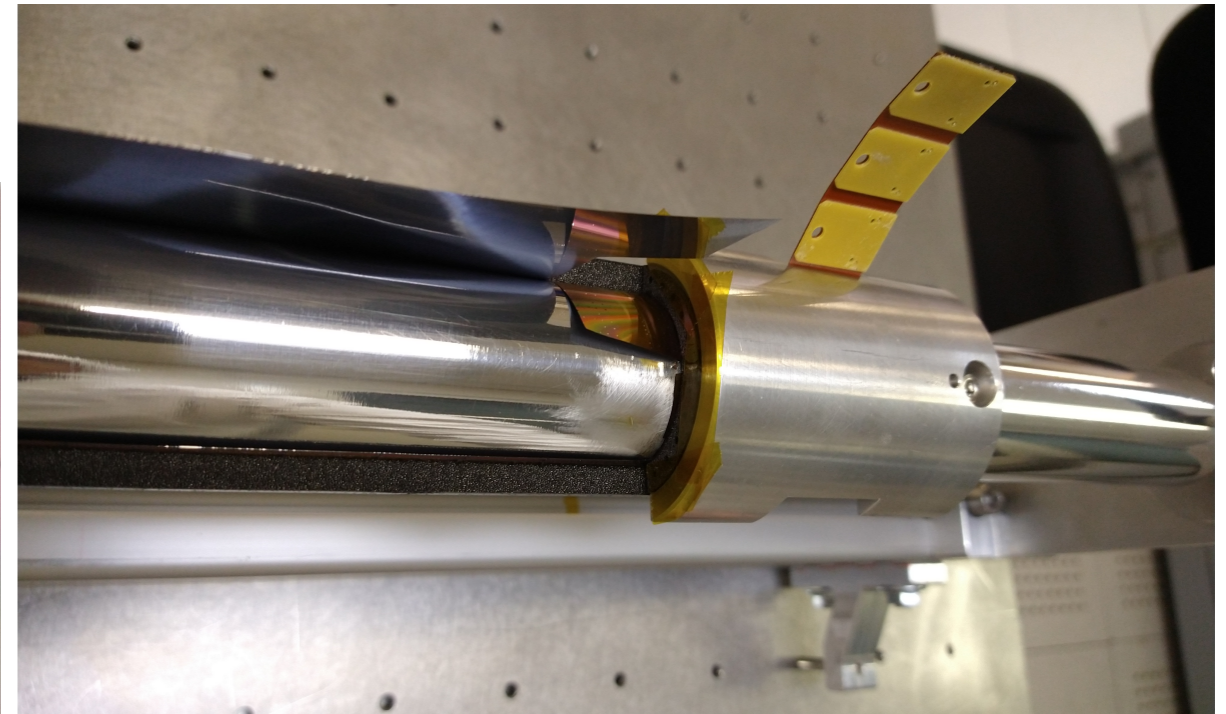
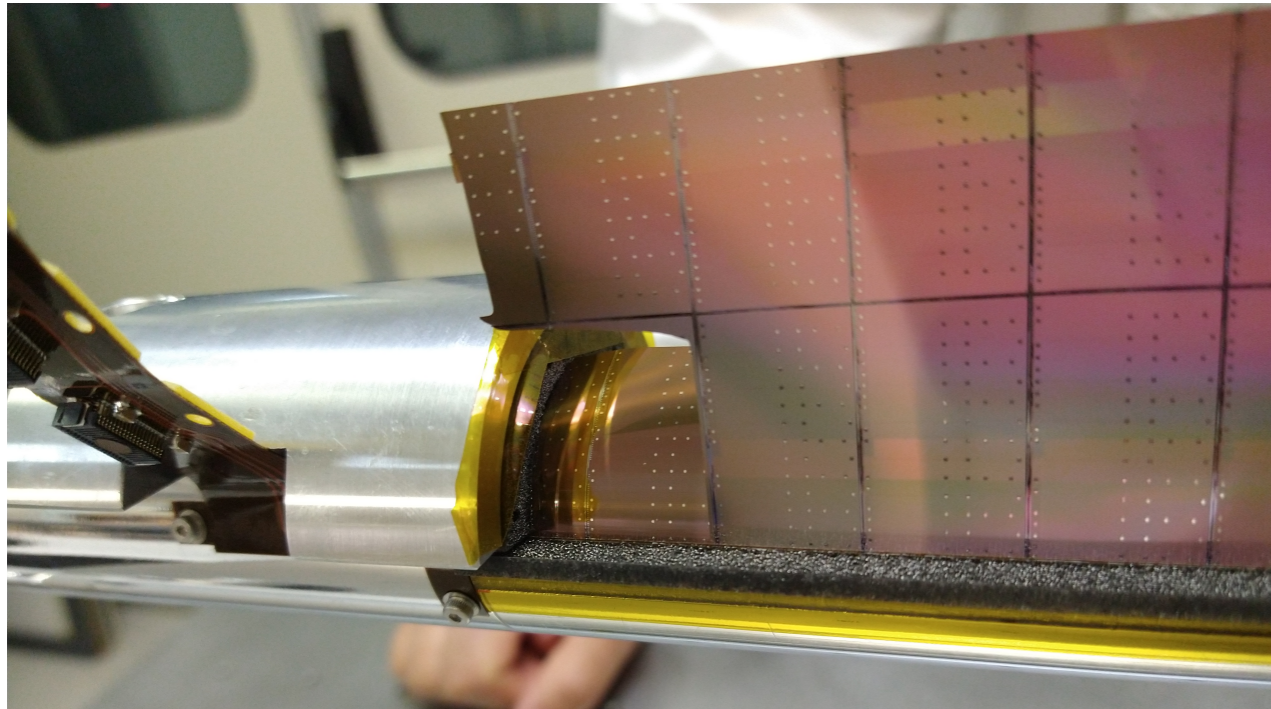
Half-ring

Glue: Araldite2011

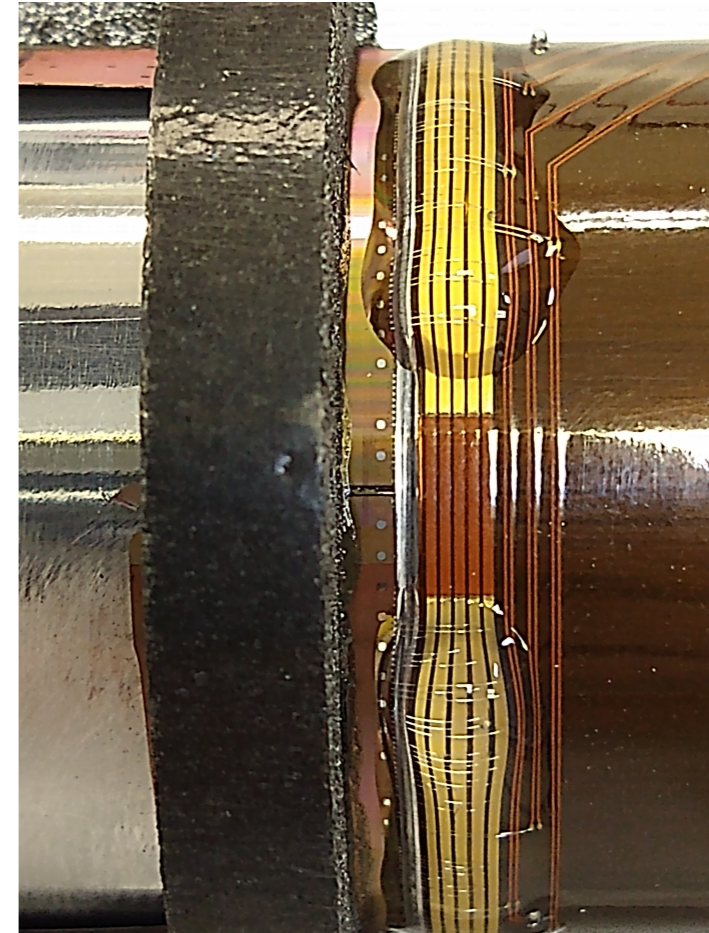
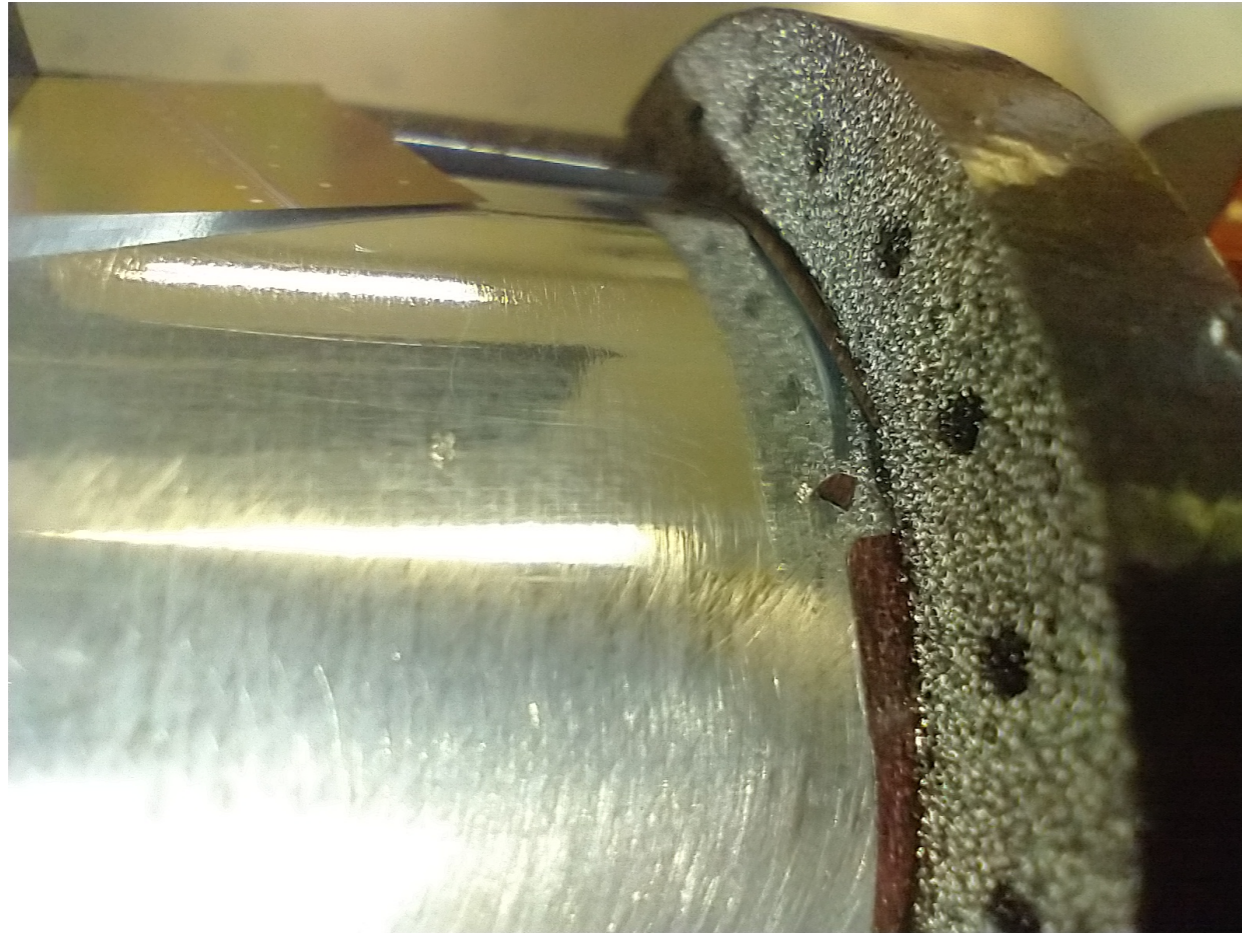


1. Sensor bending
2. Edge-FPC bonding
3. Support structures gluing
4. Exo-FPC bonding

9/11/2022 - Week 45



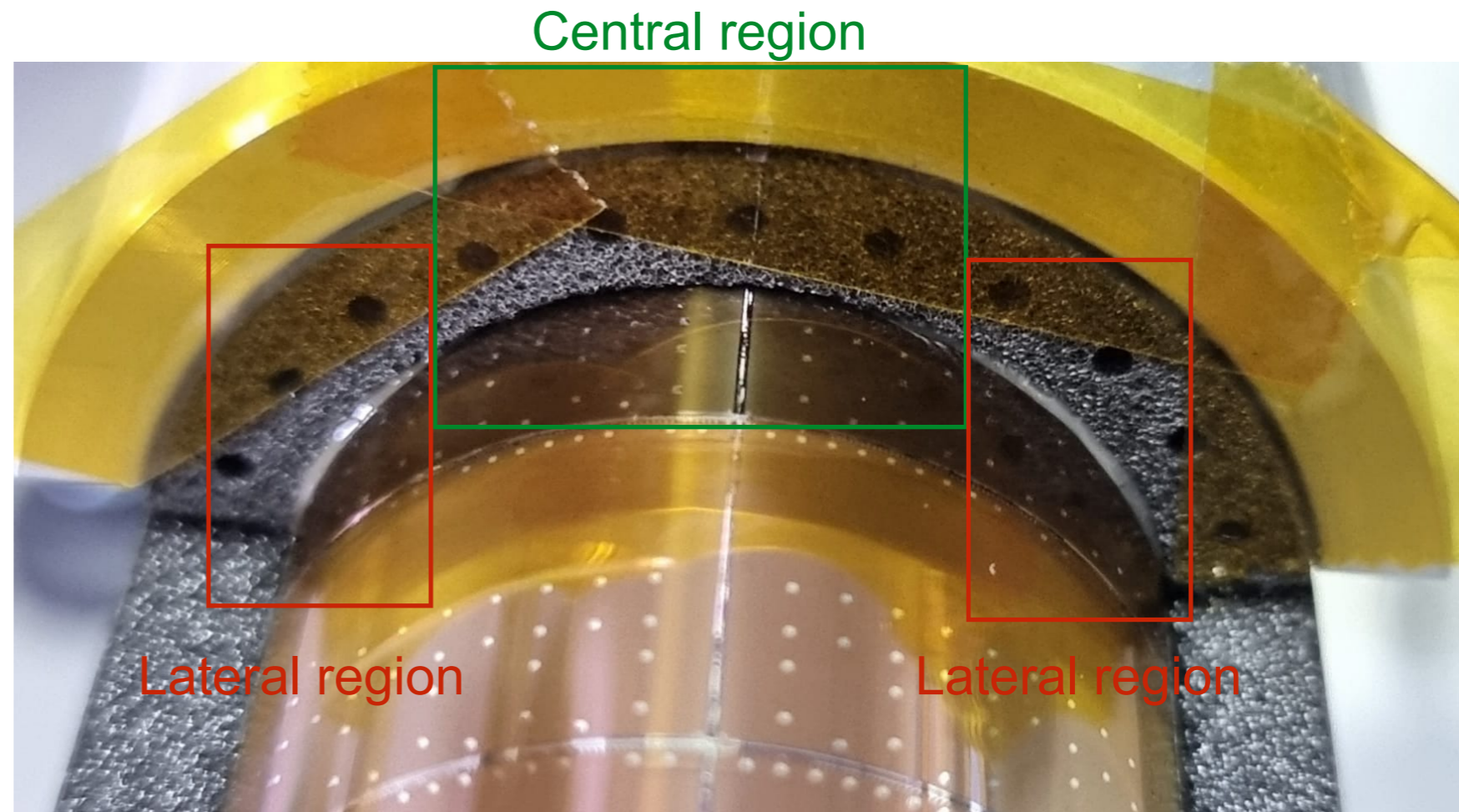
1. Sensor bending
2. Edge-FPC bonding
3. Support structures gluing
4. Exo-FPC bonding

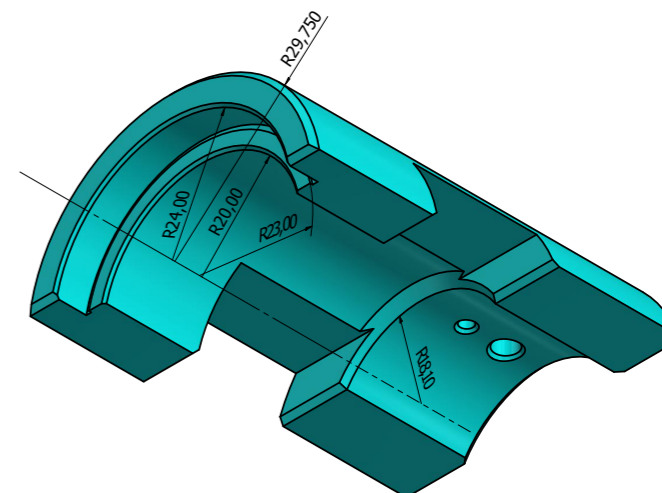
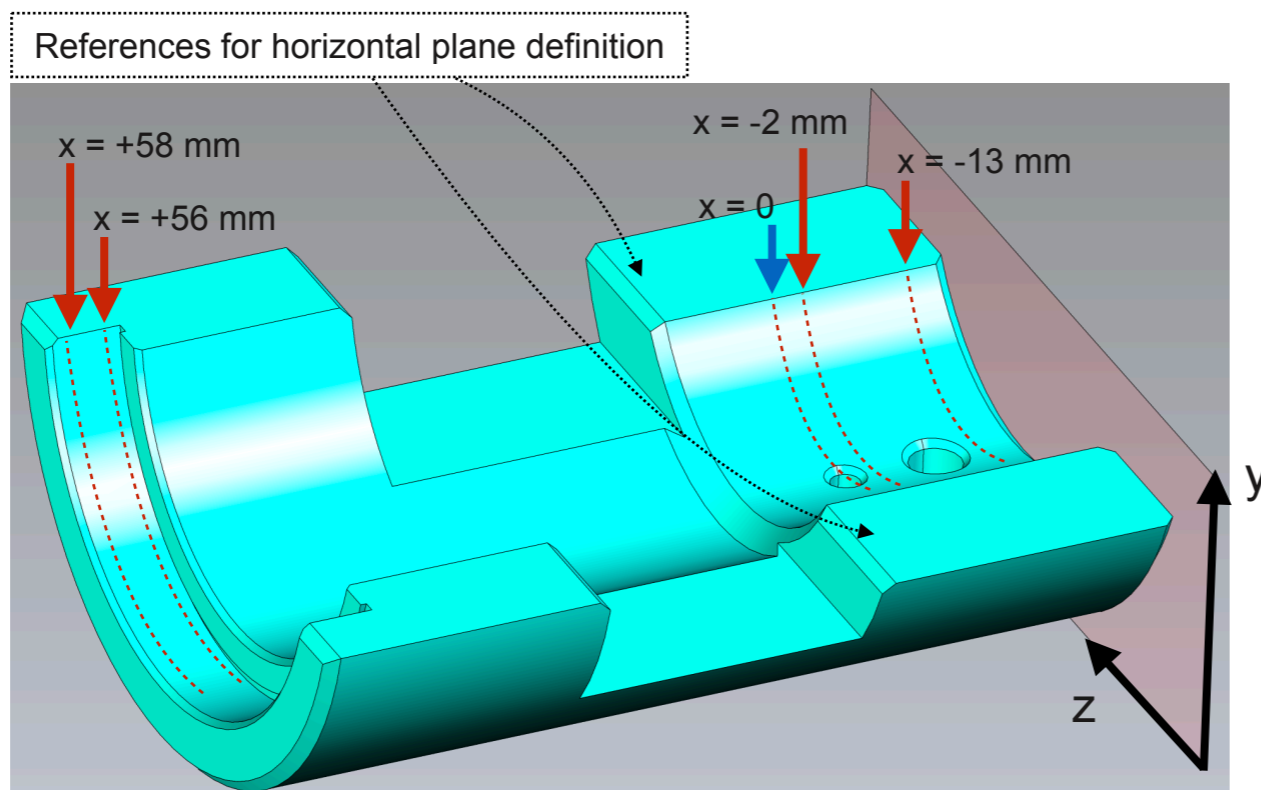


1. Sensor bending
2. Edge-FPC bonding
3. Support structures gluing
4. Exo-FPC bonding

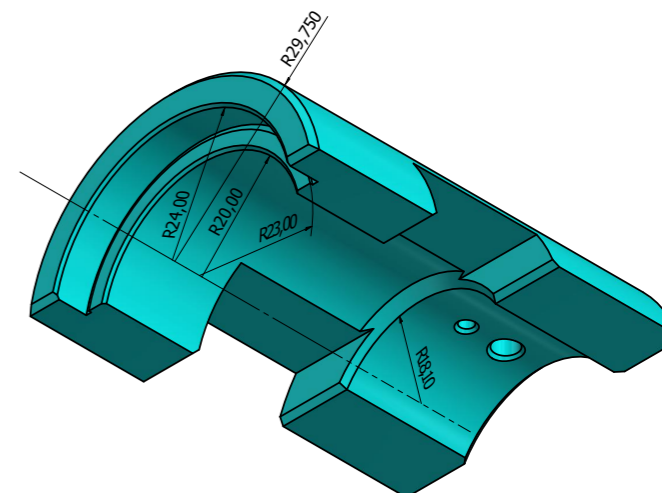
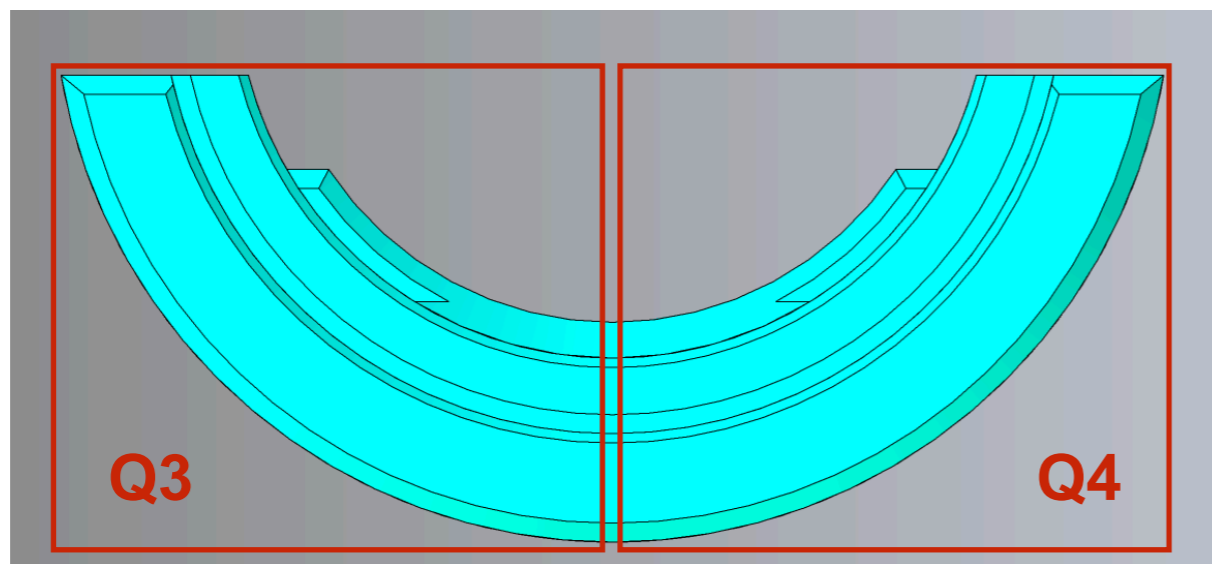
Two observations:

- Glue has been squeezed and spread out only in the lateral regions of the half-ring, while in the middle it is not.
Assuming that the glue has been distributed almost homogeneously, that means that the half-ring was pressing differently on the sensor.
- We verified (inserting a thin foil of mylar) that in between the tool and the half-ring there is a gap of few tens microns in the central region that is not there at the two sides.





	Ref. Diameter (mm)	Diameter (mm)	Delta (μm)
x = -13 mm	36,200	36,031	169
x = -2 mm	36,200	36,056	144
x = +56 mm	48,000	47,891	109
x = +58 mm	48,000	47,887	113



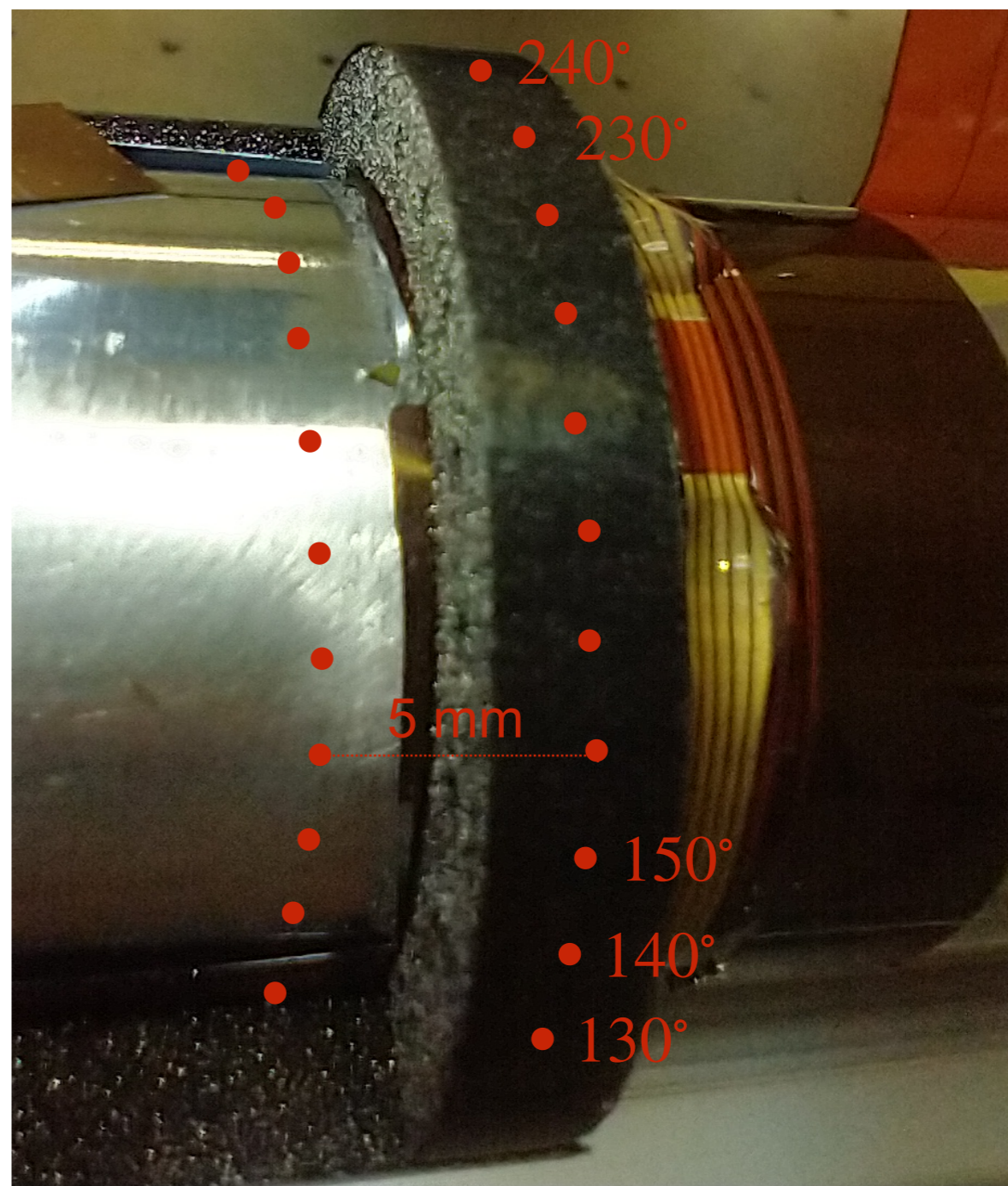
		Ref. Diameter (mm)	Diameter (mm)	Delta (μm)
Q3	x = +56 mm	48,000	47,905	95
	x = +58 mm	48,000	47,898	102
Q4	x = +56 mm	48,000	47,953	47
	x = +58 mm	48,000	47,964	36



- Degrees defined by rotary motor
- Meas. on mandrel taken directly on its surface (broken chip avoided)
- Measurement always taken with tool vertical to horizontal plane
- Distances referred to the mid-plane of the mandrel cylinder
- Reference = 6.1 mm (6 mm ring height + 0.04 silicon + ~0.05 glue)

	Half-ring (mm)	Mandrel (mm)	Delta (μm)	Delta - Ref. (μm)
130 deg.	24,085	17,973	6112	12
140 deg.	24,101	17,977	6124	24
150 deg.	24,118	17,977	6141	41
160 deg.	24,140	17,981	6159	59
170 deg.	24,143	17,983	6160	60
180 deg.	24,172	17,986	6186	86
190 deg.	24,154	17,991	6163	63
200 deg.	24,125	17,993	6132	32
210 deg.	24,139	17,996	6143	43
220 deg.	24,131	18,002	6129	29
230 deg.	24,106	18,006	6100	0
240 deg.	24,104	18,011	6093	-7

	Half-ring
Ref. Diameter (mm)	48,000
Diameter (mm)	47,987





Half-ring positioning tool modification

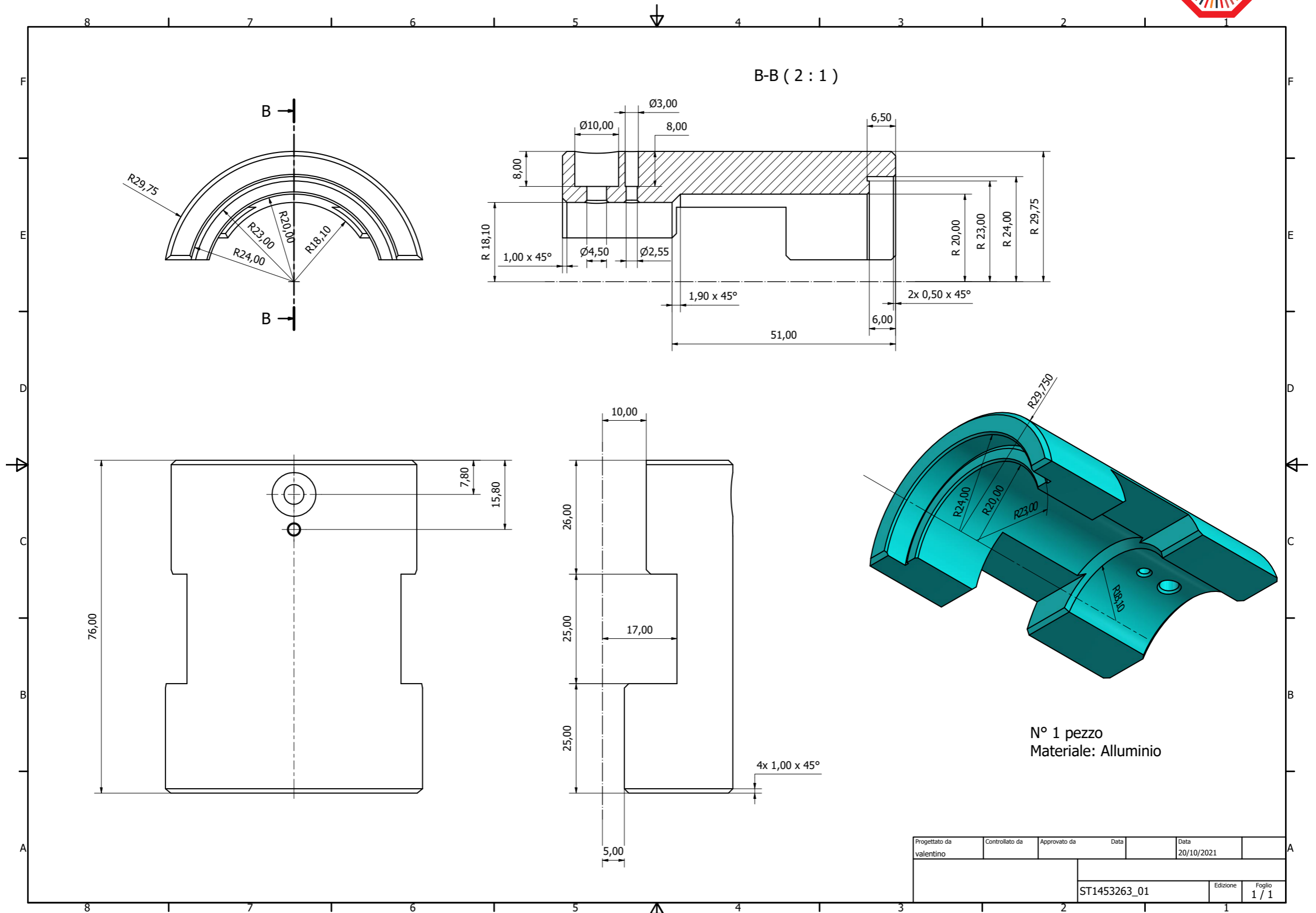


Modified version at CERN

Similarly modified the one in Bari.
No picture available; will add later.



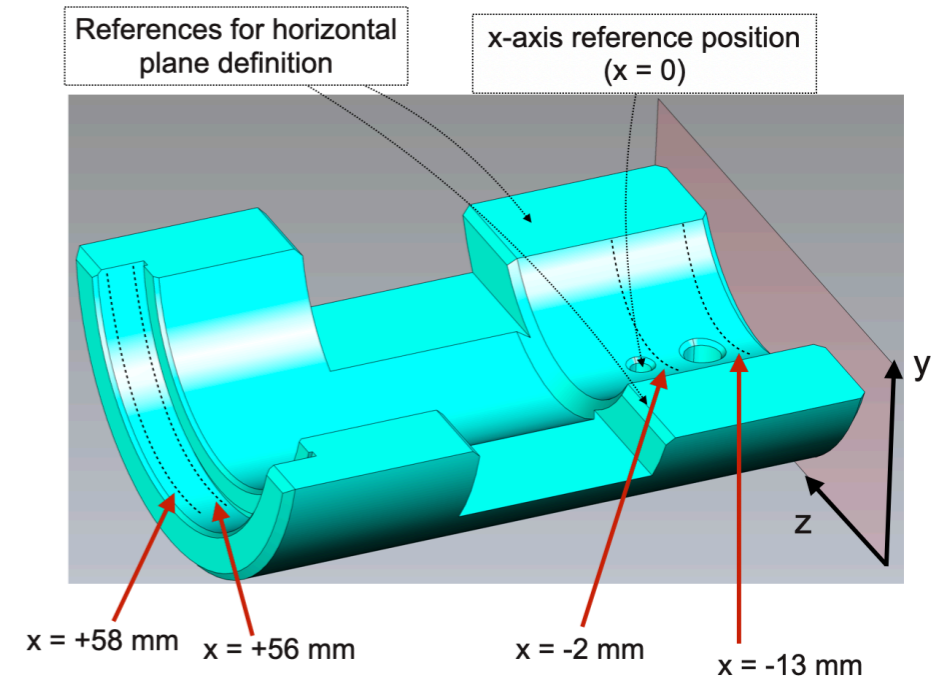
BACKUP

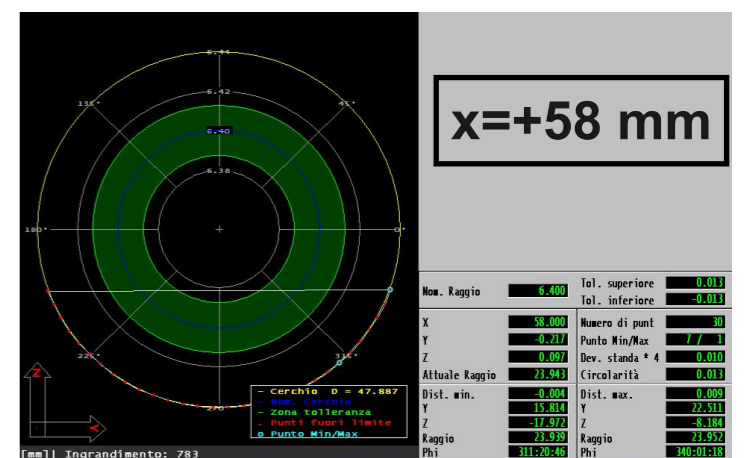
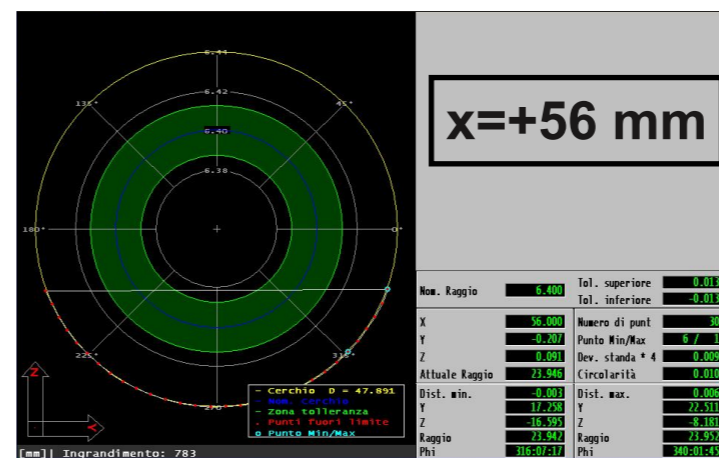
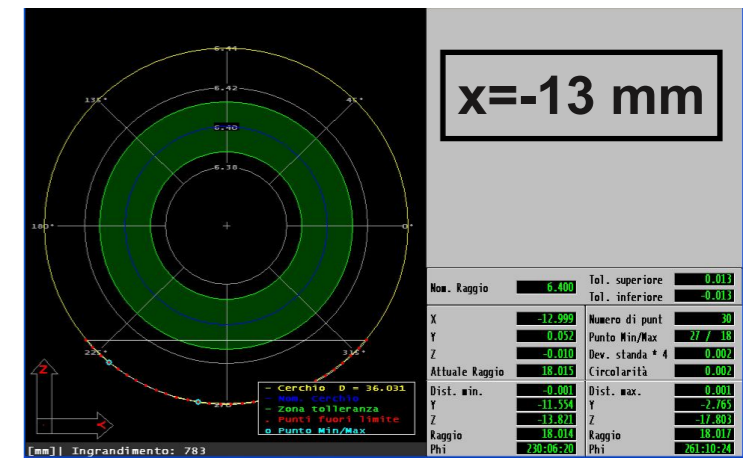
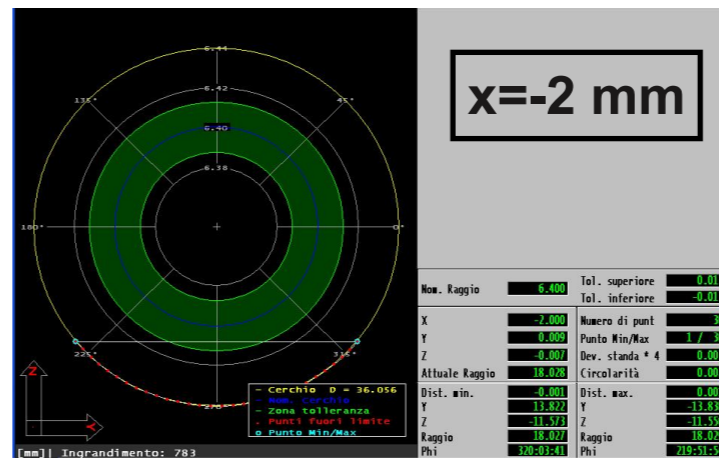
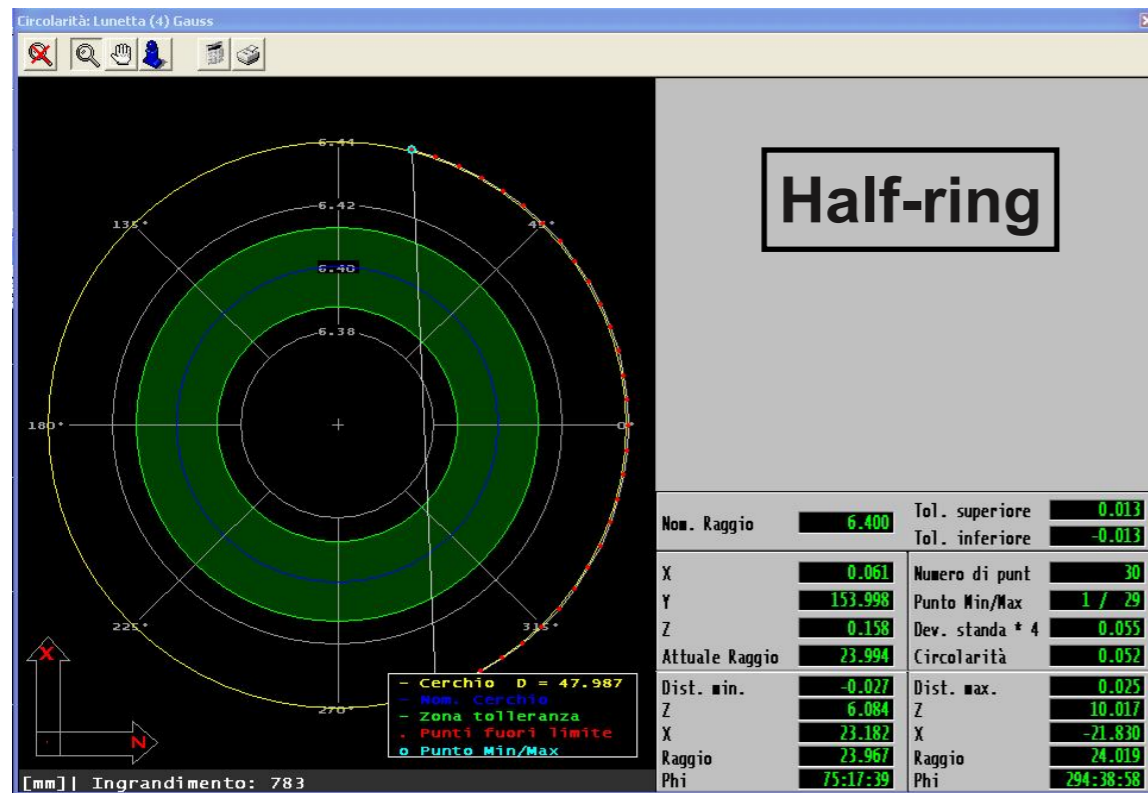
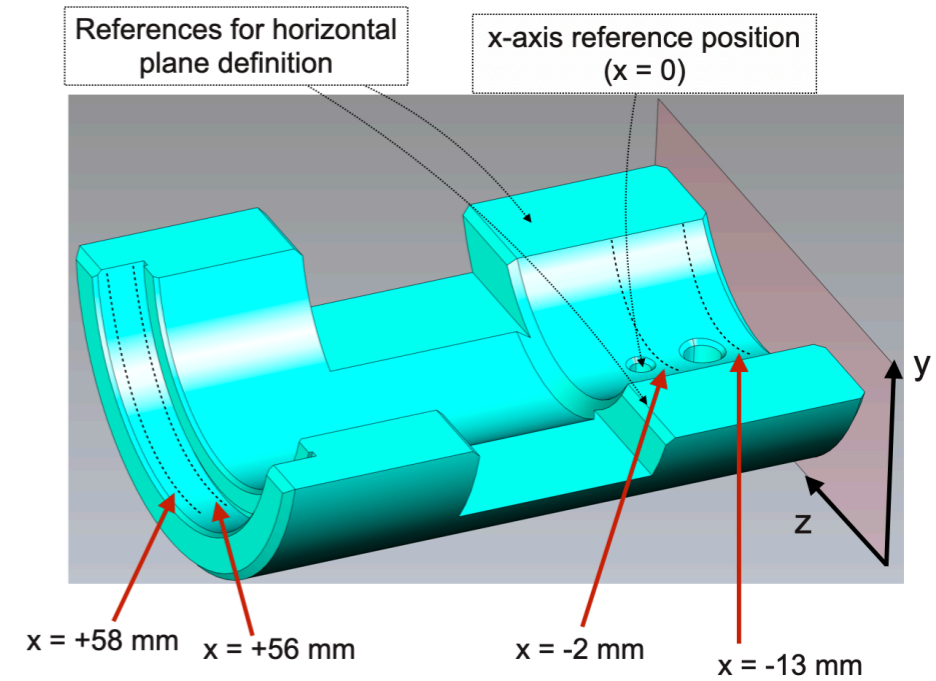
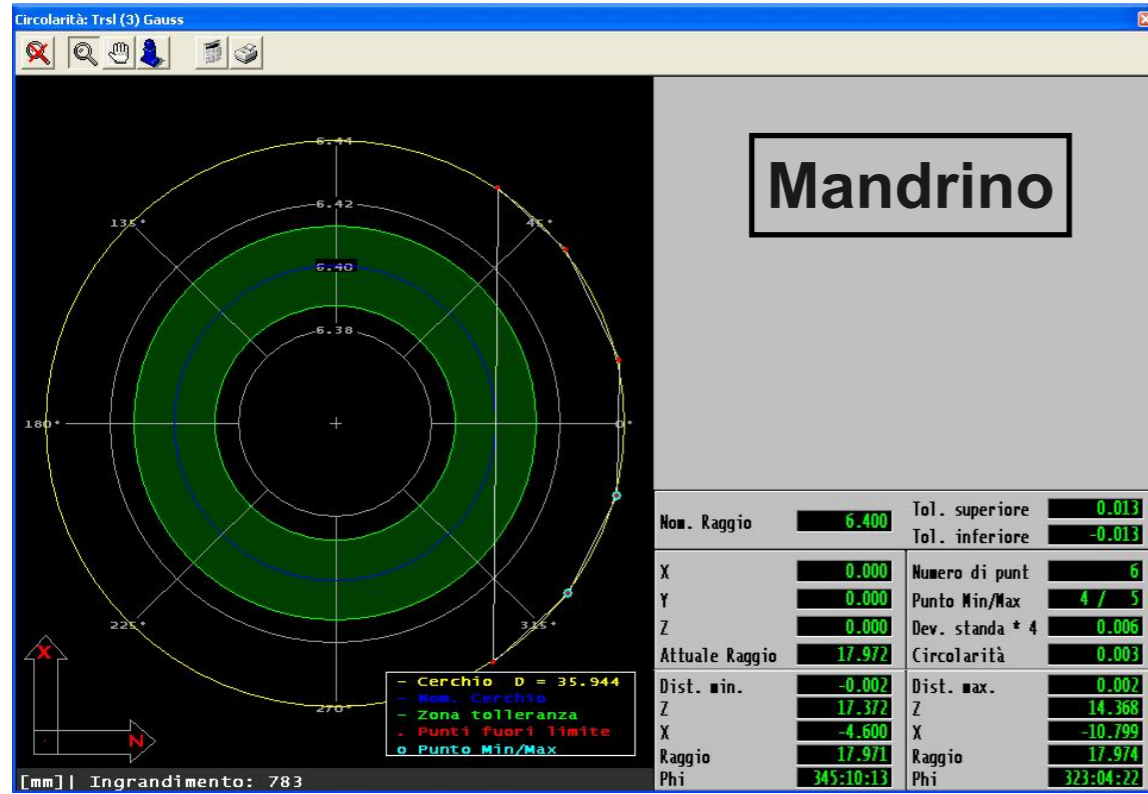




1. Sensor bending
2. Edge-FPC bonding
3. Support structures gluing
4. Exo-FPC bonding

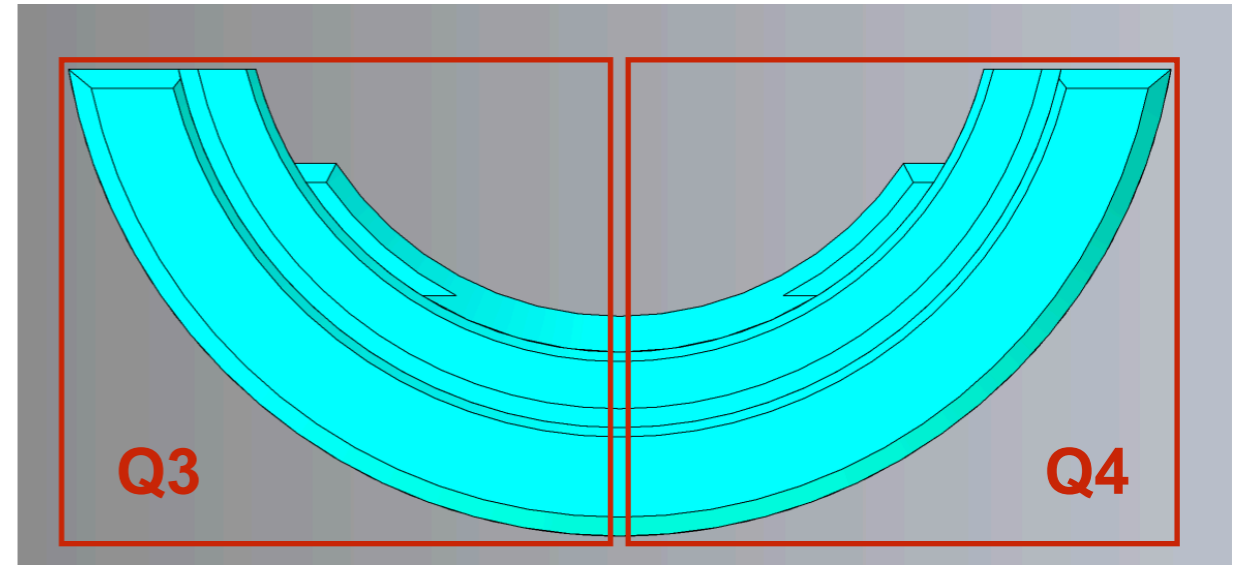
Element	X-Coord.	Y-Coord.	Z-Coord.	Diameter	Variance
	X-Angle	Y-Angle	Z-Angle	Dist./Ang.	
Tolerance	Nominal	Up/Lo	Actual	Dev./Error	
R18_-13 misura	▼ -12.999	0.052	-0.010	▼ 36.031	0.002
R18_-13		0.010		0.002	
Circolarità					**__
R18_-13	0.000	0.020	0.052	0.105	0.085
Concentricità	0.000		-0.010		-->>
R18_-2 misura	▼ -2.000	0.009	-0.007	▼ 36.056	0.002
R18_-2		0.010		0.002	
Circolarità					**__
R18_-2	0.000	0.020	0.009	0.023	0.003
Concentricità	0.000		-0.007		-->>
R18_9 misura	▼ 8.999	-0.036	-0.001	▼ 36.072	0.003
R18_9		0.010		0.003	
Circolarità					***__
R18_9	0.000	0.020	-0.036	0.072	0.052
Concentricità	0.000		-0.001		-->>
R24-56 misura	▼ 56.000	-0.207	0.091	▼ 47.891	0.010
R24-56		0.010		0.010	
Circolarità					*****
R24-56	0.000	0.020	-0.207	0.453	0.433
Concentricità	0.000		0.091		-->>
R24-58 misura	▼ 58.000	-0.217	0.097	▼ 47.887	0.013
R24-58		0.010		0.013	0.003
Circolarità					-->>
R24-58	0.000	0.020	-0.217	0.475	0.455
Concentricità	0.000		0.097		-->>
offset centro R18-13 con Origine	0.000	0.052	-0.010	0.052	
offset centro R18-2 con Origine	0.000	0.009	-0.007	0.011	
offset centro R18_9 con Origine	0.000	-0.036	-0.001	0.036	
offset centro R24-56 con Origine	0.000	-0.207	0.091	0.227	
offset centro R24-58 con Origine	0.000	-0.217	0.097	0.238	



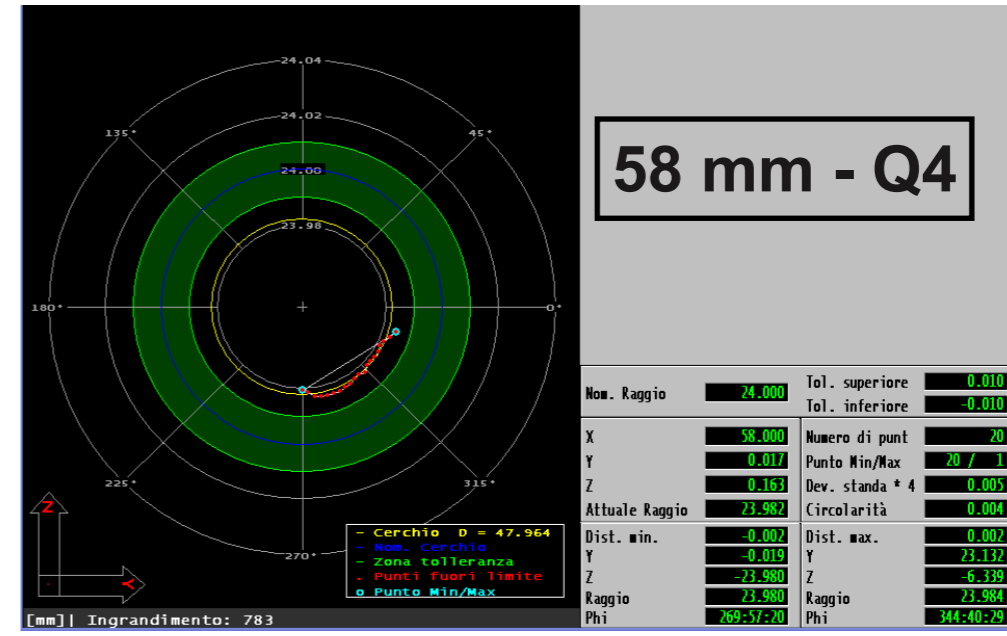
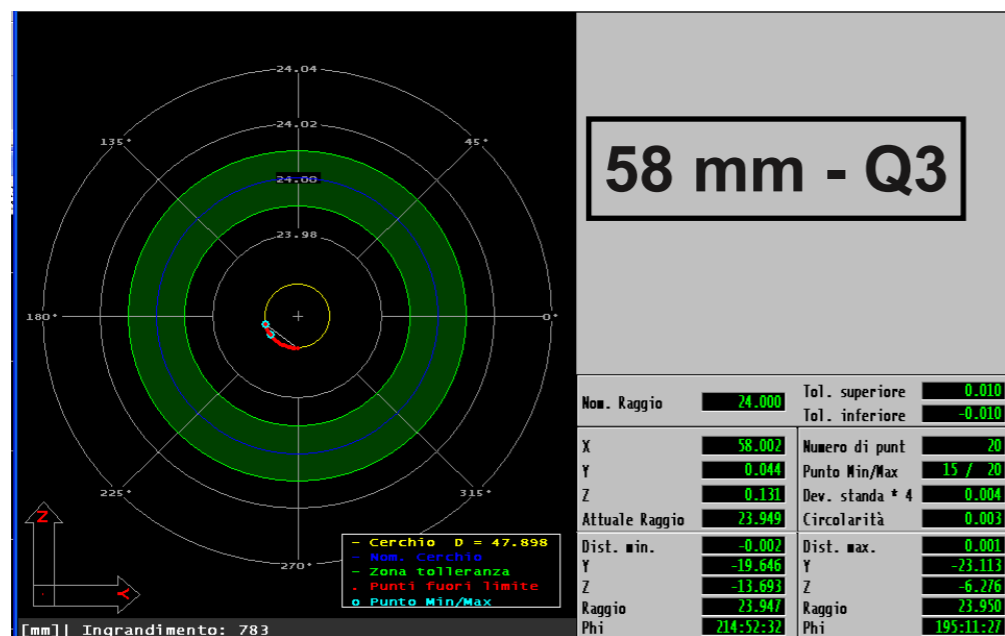
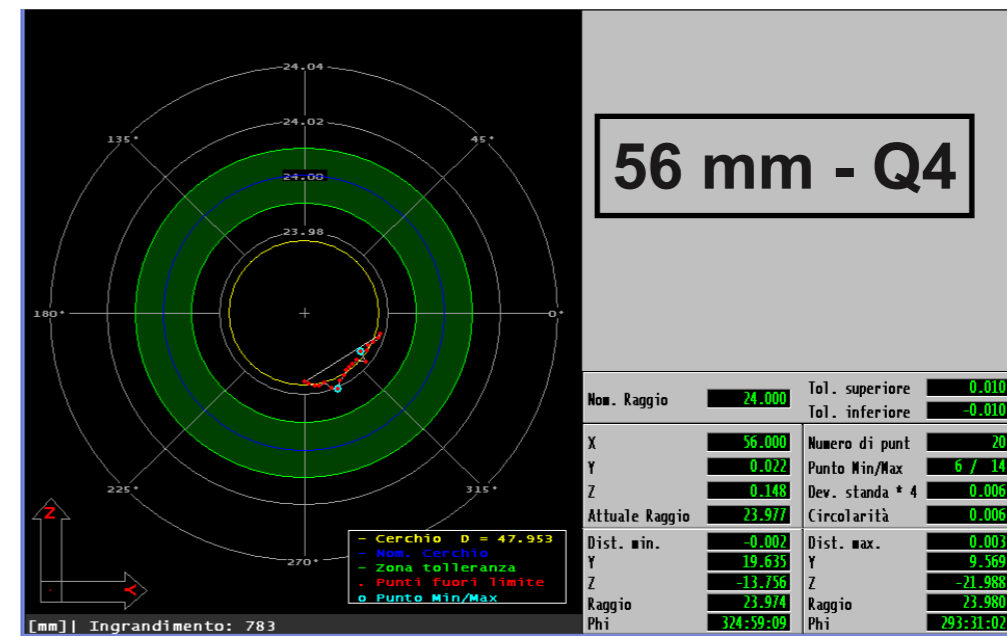
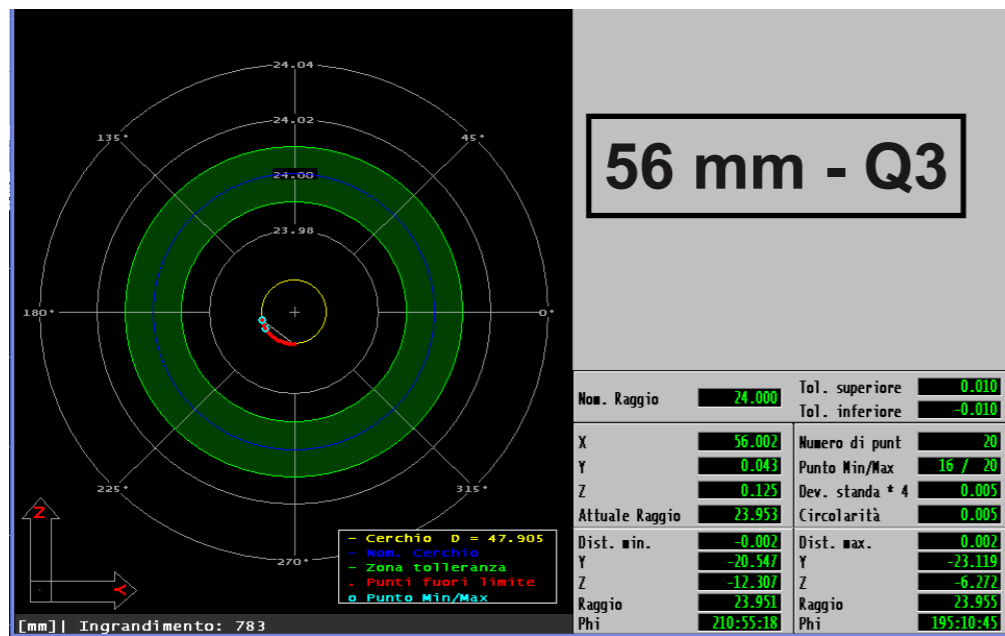
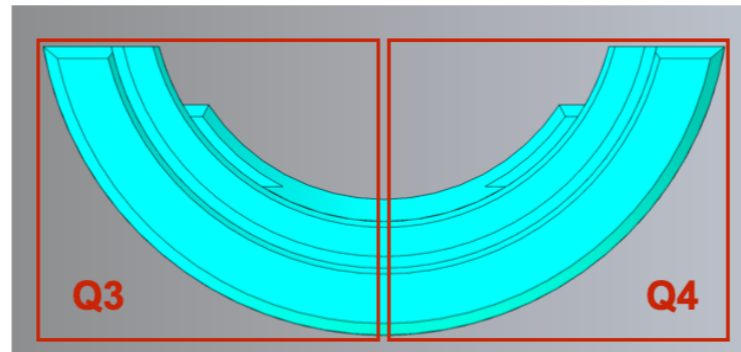




1. Sensor bending
2. Edge-FPC bonding
3. Support structures gluing
4. Exo-FPC bonding



El. No.	Line No	Element	Pnt.	X-Coord. X-Angle	Y-Coord. Y-Angle	Z-Coord. Z-Angle	Diameter Dist./Ang.	Variance
		Tolerance	Ref.	Nominal	Up/Lo	Actual	Dev./Error	
7	29	R24_56-4Q Gauss	20	56.000	0.022	0.148	47.953	0.006
8	32	R24_56-3Q Gauss	20	56.002	0.043	0.125	47.905	0.005
9	35	R24_58-4Q Gauss	20	58.000	0.017	0.163	47.964	0.004
10	38	R24_58-3Q Gauss	20	58.002	0.044	0.131	47.898	0.003
7	41	R24_56-4Q			0.010		0.006	
		Circularità						****_
7	42	R24_56-4Q	Y	0.000	0.020	0.022	0.299	0.279
		Concentricità	Z	0.000		0.148		-->>
8	43	R24_56-3Q			0.010		0.005	
		Circularità						****_
8	44	R24_56-3Q	Y	0.000	0.020	0.043	0.264	0.244
		Concentricità	Z	0.000		0.125		-->>
9	45	R24_58-4Q			0.010		0.004	
		Circularità						***_
9	46	R24_58-4Q	Y	0.000	0.020	0.017	0.327	0.307
		Concentricità	Z	0.000		0.163		-->>
10	47	R24_58-3Q			0.010		0.003	
		Circularità						***_
10	48	R24_58-3Q	Y	0.000	0.020	0.044	0.276	0.256
		Concentricità	Z	0.000		0.131		-->>





Original table from Pasquale

Element	X-Coord.	Y-Coord.	Z-Coord.	Diameter
	X-Angle	Y-Angle	Z-Angle	Dist./Ang.
Tolerance	Nominal	Up/Lo	Actual	Dev./Error
diametro Lunetta	0.061	153.998	0.158	47.987
lunetta Quota a 130° motore			24.085	
cilindro Quota			17.973	
lunetta Quota a 140° motore			24.101	
cilindro Quota			17.977	
lunetta Quota a 150° motore			24.118	
cilindro Quota			17.977	
lunetta Quota a 160° motore			24.140	
cilindro Quota			17.981	
lunetta Quota a 170° motore			24.143	
cilindro Quota			17.983	
lunetta Quota a 180° motore			24.172	
cilindro Quota			17.986	
lunetta Quota a 190° motore			24.154	
cilindro Quota			17.991	
lunetta Quota a 200° motore			24.125	
cilindro Quota			17.993	
lunetta Quota a 210° motore			24.139	
cilindro Quota			17.996	
lunetta Quota a 220° motore			24.131	
cilindro Quota			18.002	
lunetta Quota a 230° motore			24.106	
cilindro Quota			18.006	
lunetta Quota a 240° motore			24.104	
cilindro Quota			18.011	

- Degrees defined by rotary motor
- Meas. on mandrel taken directly on its surface (broken chip avoided)
- Measurement always taken with tool vertical to horizontal plane

