ATLAS ITk Lecce Update

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Local support FDR (Final Design Review)

Ieri ed oggi ci sono le presentazioni del Local Support FDR per Outer Barrel e Outer Endcap: https://indico.cern.ch/event/1075990/

Presentazione interessante di Review per i local support dell'Outer Encap:

- Endcap Half Ring Design and Interfaces - Peter Sutcliffe (University of Liverpool (GB))

- OE Bare Local Supports Qualification: Material and Electrical (G&S) Francisca Munoz Sanchez (University of Manchester (GB))

NB: Mi hanno chiesto i nomi sul documento di Local Support FDR per l'Outer Barrel ed io ho comunicato Il mio, quello di Alessandro (handling frame) e quello di Rita (transport box). Ovviamente sul Loaded Local Support FDR ci sarà il nome di tutto ITK Lecce (Prossima slide).

Local support FDR from Cecilia

- End-cap local supports are fabricated in two independent lines, one in Italy and one in UK.
  - The Italian line will produce 50% of Layer 2 and all Layer 4 Half rings.
  - The UK line will produce 50% of Layer 2 and all Layer 3 Half rings. This is mainly based on machining facilities.

- In the latest ITk schedule, production of Layer 2 HR will happen from November 2022 to September 2023. Layer 4 (IT) and Layer 3 (UK) HR will be produced from September 2023 to December 2024.

Number Bare Half Ring depends on the number of Loaded local supports needed:

Sub-system	Needed for detector	Production (includes yield)	Pre-production	Total to produce
Endcap A	56	58	4	62
Endcap C	56	58	4	62

Required loaded local supports

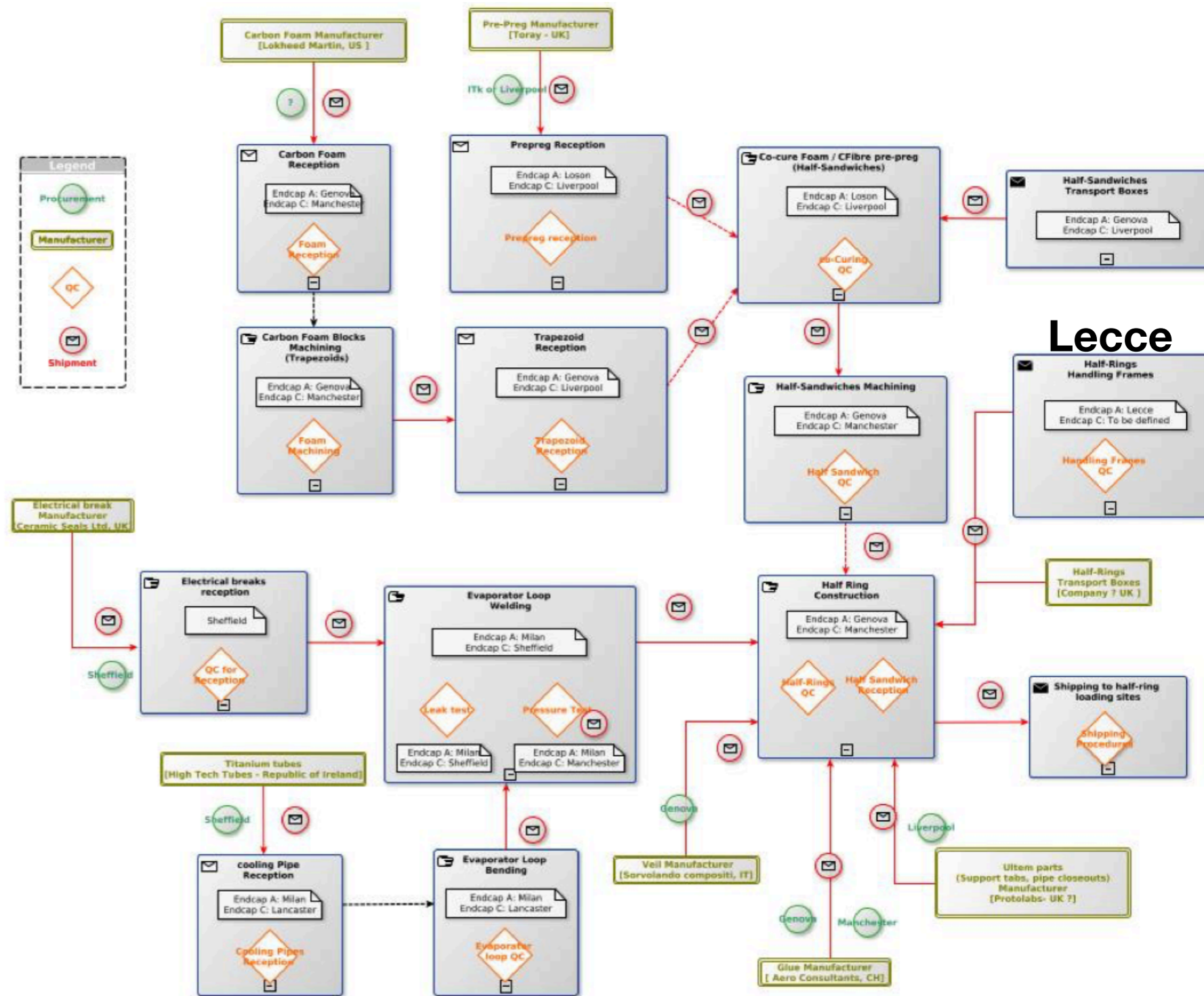| Sub-system	Needed	Production (includes yield)	Pre-production	Total to produce
Endcap A	62	68	4	72
Endcap C	62	68	4	72

Required bare local supports

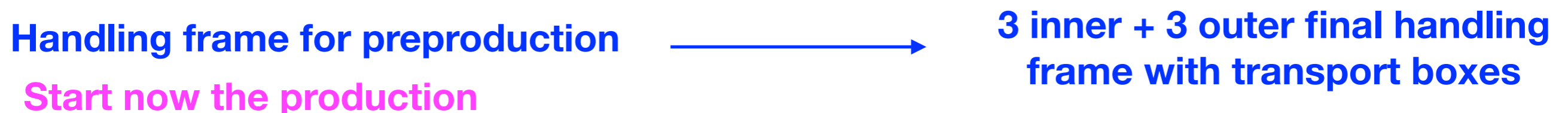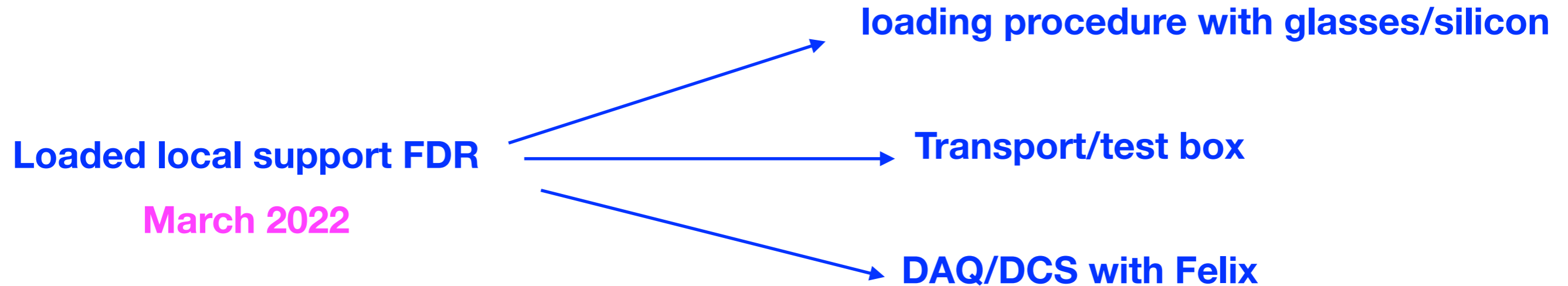Production flow diagram illustrates sequential steps of LS fabrication procedure.

➢ Shipments and QC procedures are explicitly indicated.

➢ The exact place where the manufacturing or testing is performed is also indicated.
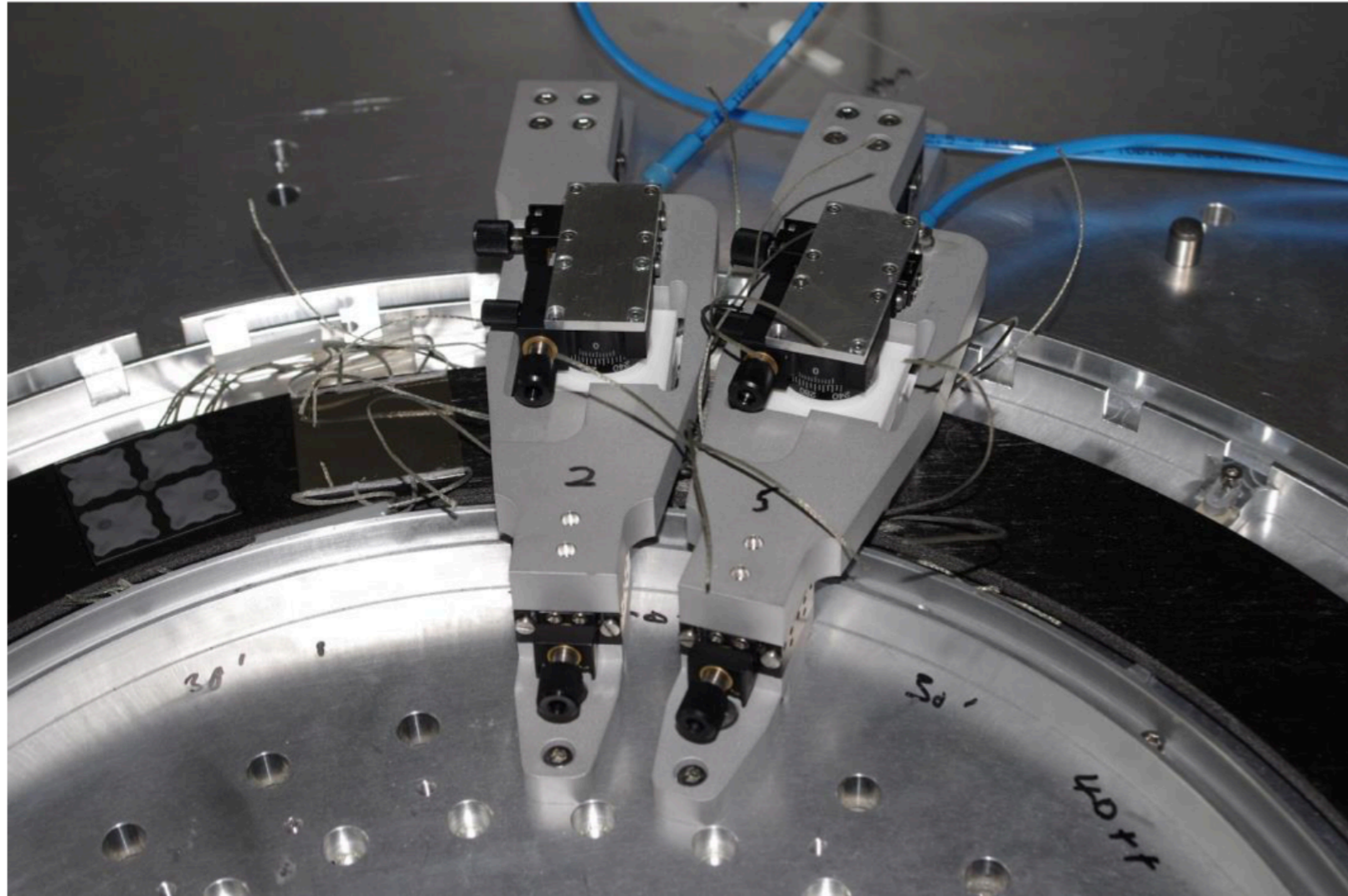
Identical production flow.

Only relevant difference is co-curing of the HS:
Italy → External company (Loson),
UK → University lab (Liverpool).

Lecce

Impegni di Lecce a corto termine

Loaded local support FDR → **loading procedure with glasses/silicon**

→ **Transport/test box**

March 2022 → **DAQ/DCS with Felix**

Half ring integration tool in half shell → **Purchase linear guide to install in Frascati**

Dec 2021

Handling frame for preproduction → **3 inner + 3 outer final handling frame with transport boxes**

Start now the production

Four loading sites: RAL
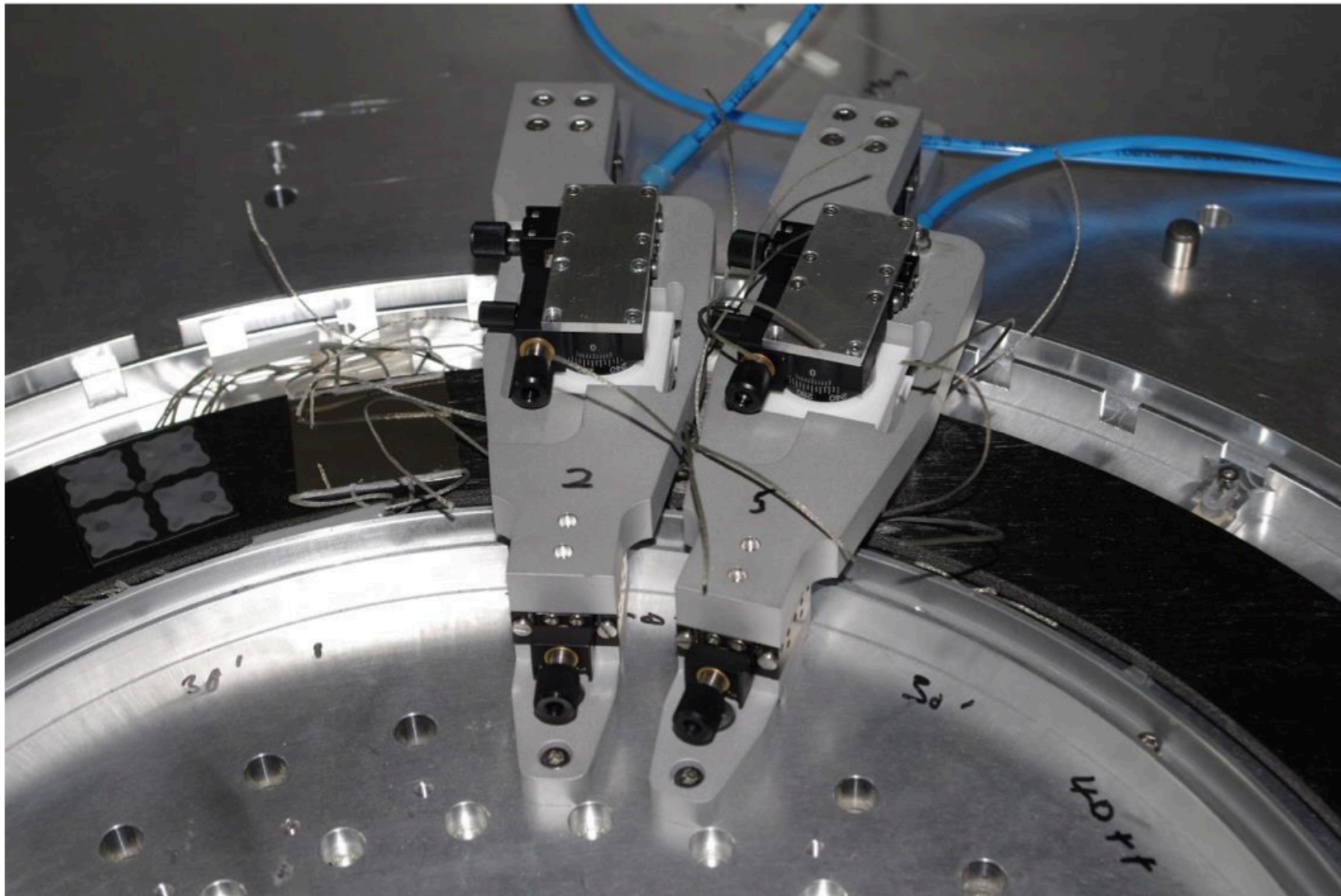

Gantry X,Y,Z

No Theta Stage

Manual bridges with manual micrometric xyz-theta adjustments

Needed custom made baseplate

No need to wait for glue curing between two modules.

Build a working UK Half-Ring 0 Now building UK Half-Ring 1

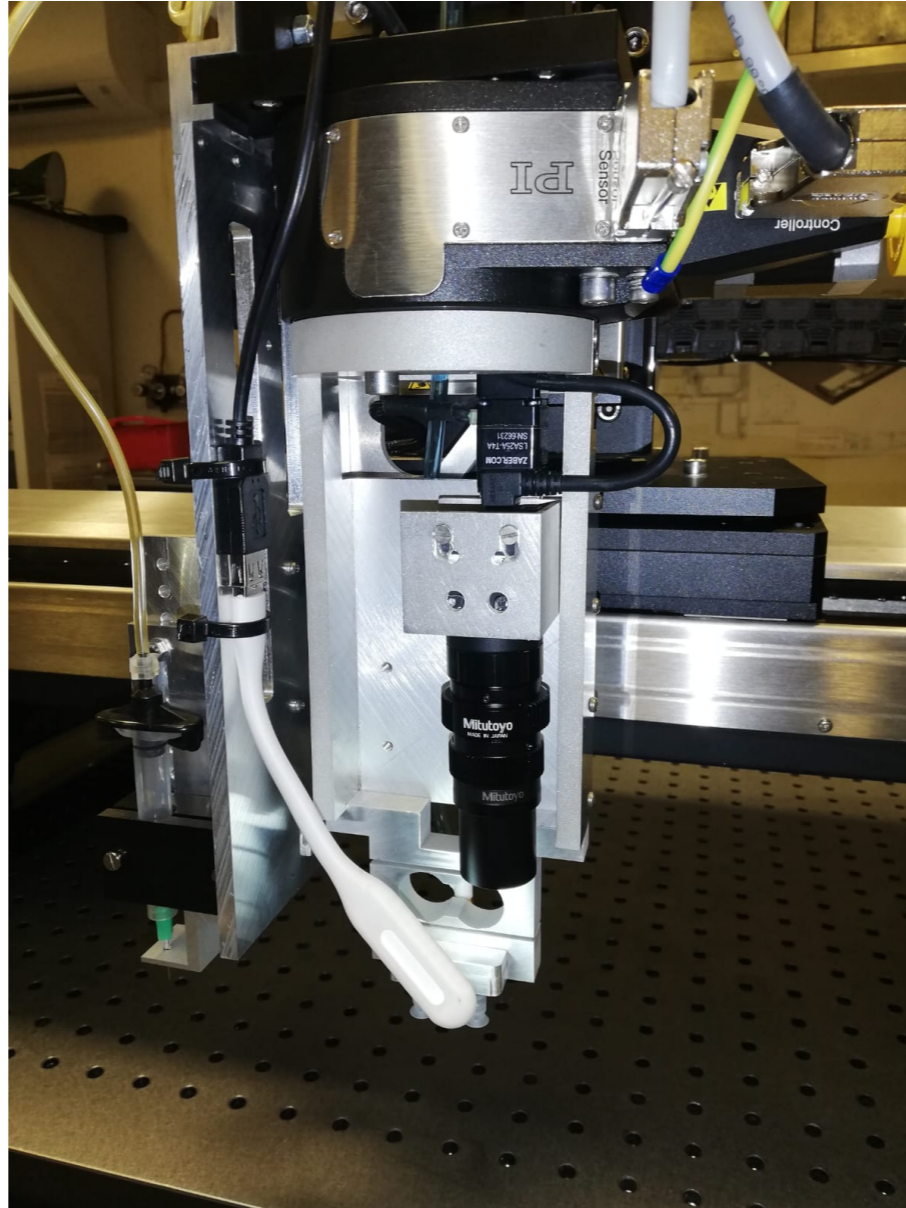# Four loading sites: Oxford
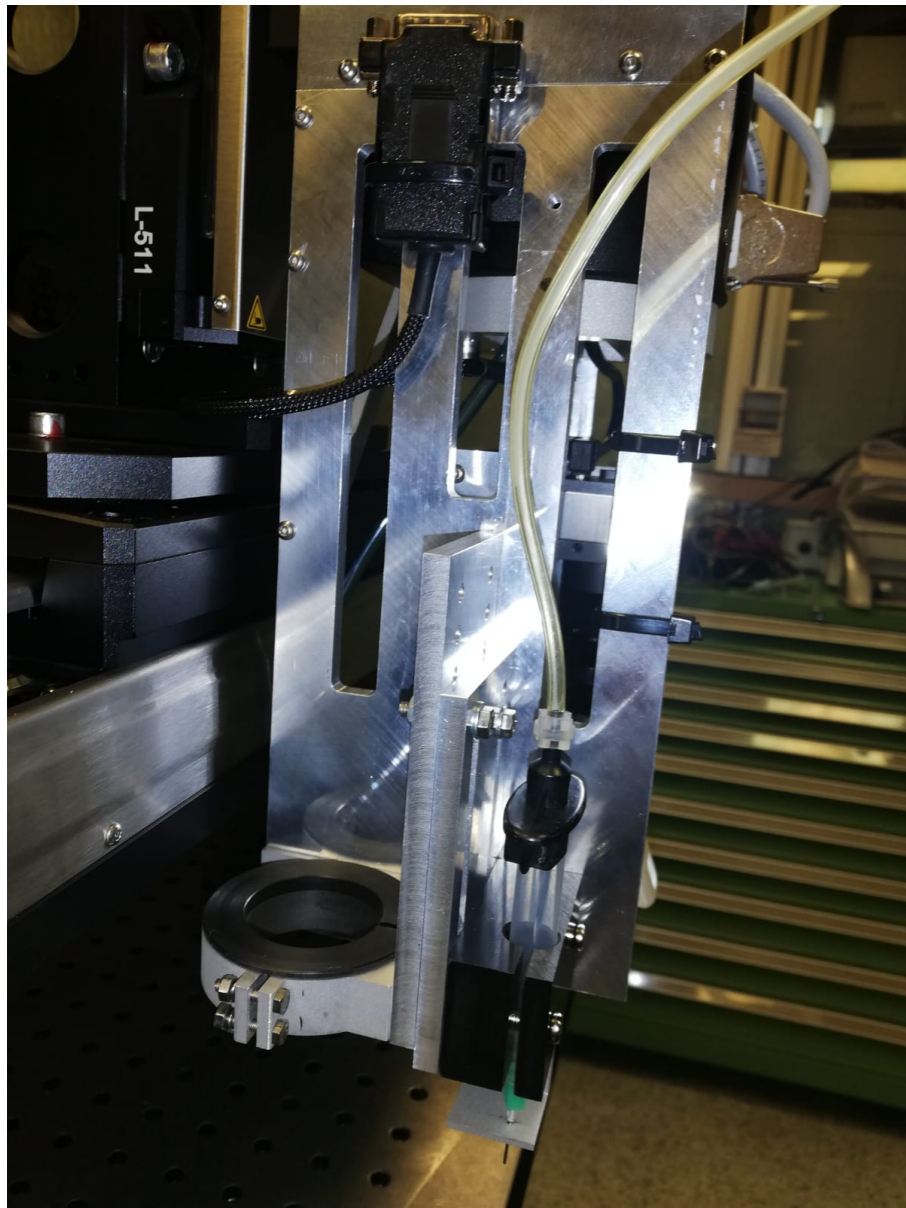

Gantry X,Y,Z,Theta

Automatic Bridges

Needed custom made baseplate

No need to wait for glue curing between two modules.

Just started

Four loading sites: Genova

Gantry X,Y,Z,Theta

Pick&Place head with microscope independent z-movements (supervised module after pick)

No need custom made baseplate

Need to wait for glue curing between two modules.

Just started

Four loading sites: Lecce vs Genova

GE

Gantry X,Y,Z,Theta

Pick&Place head with microscope independent z-movements (supervised module after pick)

No need custom made baseplate

Need to wait for glue curing between two modules.

Just started

LE

Gantry X,Y,Z,Theta

Pick&Place head

Microscope on z stage (no supervised module after pick)

No need custom made baseplate

Need to wait for glue curing between two modules.

Hardware and software (Labview + Original) capable to due a large scale loading exercise.

Glue thickness and chip coverage

The most crucial step it is the final glue thickness and chip coverage.

It is related to:
-Deposited glue quantity (assuming good spread when loading)
-Module planarity
-Half-ring local support local planarity
-Relative orientation in space of module chip surface and half ring during loading

Strategy to deal with
-RAL   : pillars and silicon spheres (already tried)
-OXFORD : silicon sphere (already tried) and
-GENOVA : Strain Gauge on Pick&Place head (to be proven)
-LECCE   : Geometrical plane adjustment of (parking tool ?) and pick and place head to be parallel to the half-ring (our next goal)