Science and Technology Facilities Council

OB FPC prototyping

WP3 Electrical interfaces

Science and Technology Facilities Council

marcello.borri@stfc.ac.uk

Outline

Reporting a snapshot of the evolutionary development of the SVT & its components

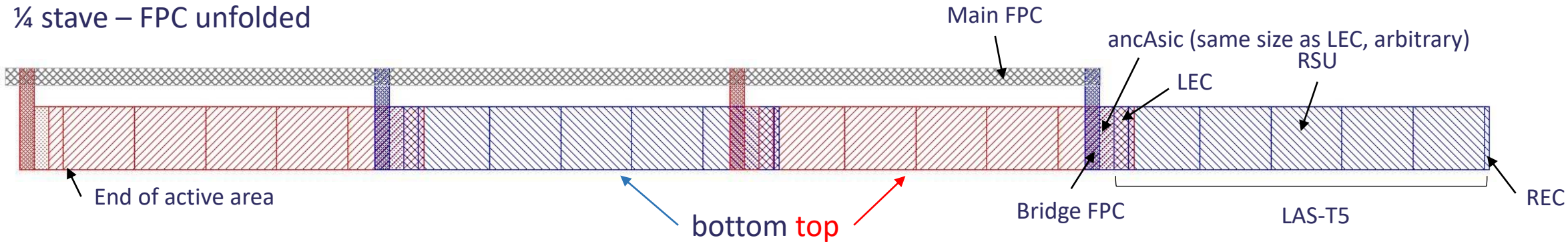
- Recap of design on low TRL prototyping for OB:
  - Based on a snapshot of project from Feb. 2024;
  - Stave layout;
  - Circuit definition;
  - Signal ratings;
- Manufacturing technology;
- Module layout;

Science and Technology Facilities Council

Stave layout

Modules/LAS on stave & FPCs

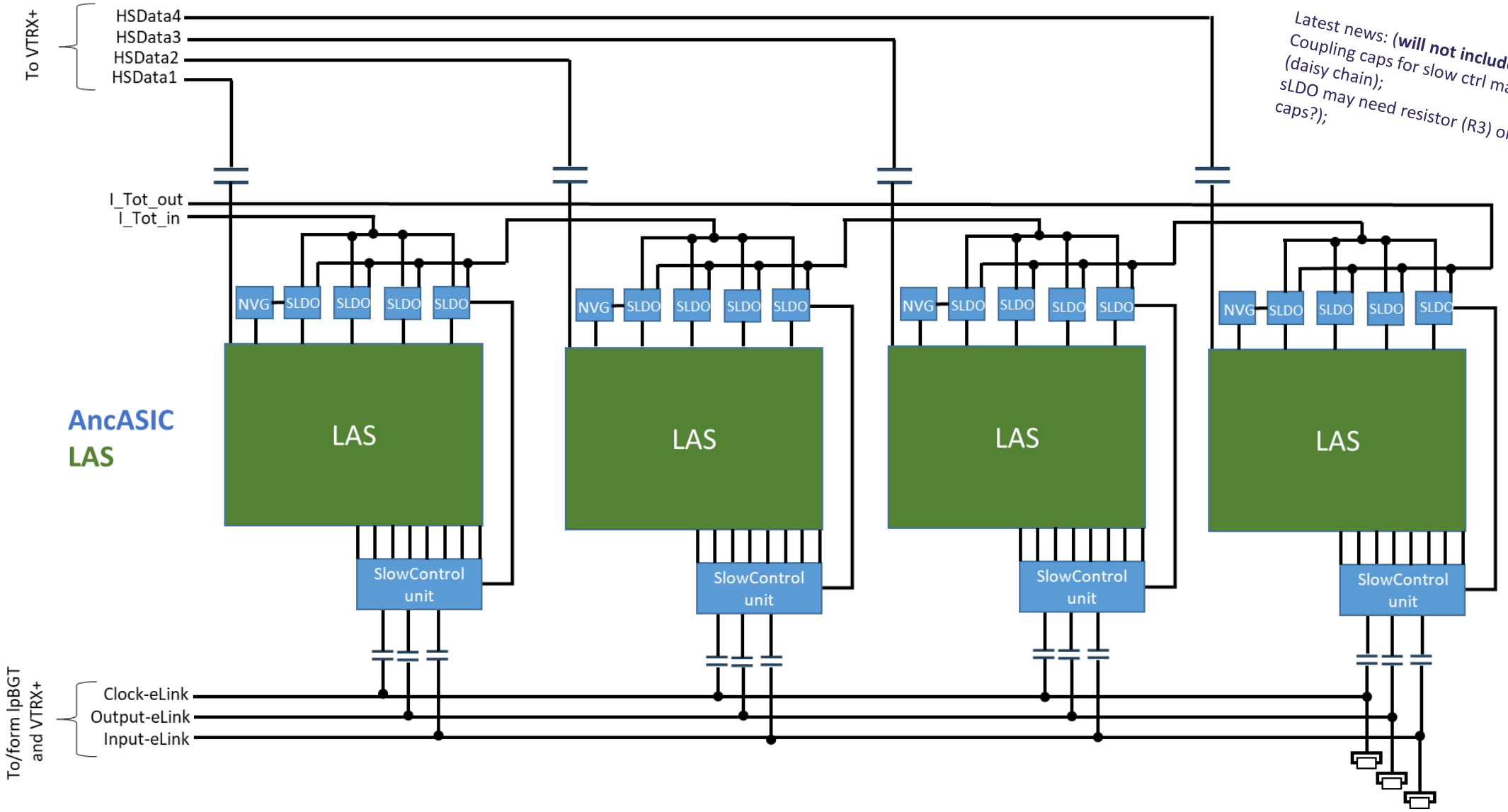
¼ stave – FPC unfolded



Bridge FPC: connects ancASICs to Common Bus FPC; Size: W: ~5mm; L: ~340mm;
Main FPC: connects FPC bridges to end of stave; Size: W: ~5mm; L: ~30mm;

Science and Technology Facilities Council

Circuit definition



Latest news: (**will not include in this prototype**)
Coupling caps for slow ctrl may not be necessary (daisy chain);
sLDO may need resistor (R3) on FPC and (decoupling caps?);

FPC connects the AncASIC to the DAQ system and pwr supplies.

Presenting a sequence of 4 sensors.
[longest sequence in Epic Svt]

Science and Technology Facilities Council

Signal ratings

Signal name	Type	Comment	Coupling	Standard	lpGBT eLink	Rate
slow ctrl clk (down)	AC	from lpGBT to AncASIC	Capacitive	CERN Low Powering Signal (CLPS)	clock-eLink	80 Mb/s
slow ctrl write (down)	AC	from lpGBT to AncASIC	Capacitive	CERN Low Powering Signal (CLPS)	output-eLink	80 Mb/s
slow ctrl read (up)	AC	from AncAsic to lpGBT	Capacitive	CERN Low Powering Signal (CLPS)	input-eLink	160 Mb/s
data	AC	from AncAsic to VTRX+ (1 diff line/AncASIC)	Capacitive	CERN Low Powering Signal (CLPS)	N/A	5.12 Gb/s (or 10Gb/s)
voltage supply	DC	Max: (2.5V/AncASIC) * (4 AncASIC)	Direct	10% Vdrop for 2.5V/LAS, is it OK?	N/A	N/A
current	DC	2.5 A (total per AnASIC)	Direct		N/A	N/A

To check: Is voltage supply still 2.5V ? (1.8V?)
To check: Is current supply still 2.5A ? (worst case)

Manufacturing technology

Supplier RPE LTU

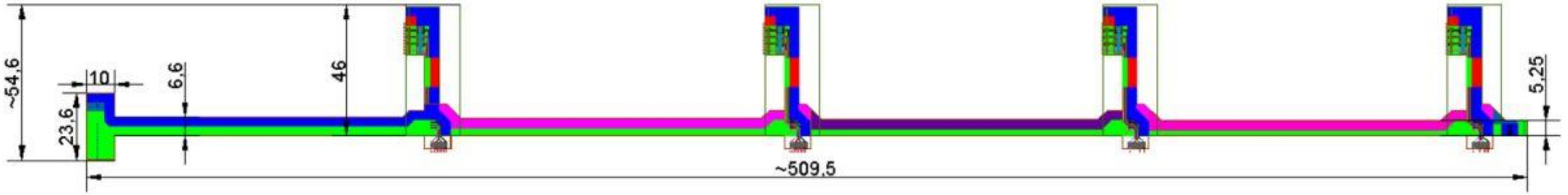
Science and Technology Facilities Council

Updated preliminary design: unfolded assembled FPC

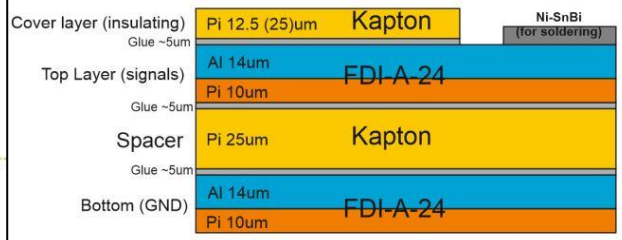
Composition of the assembled FPC:

- a) Main FPC (M-FPC in short) – 1pc
- b) Bridge FPC (B-FPC in short) – 4 pcs (same FPCs)

Schematic cross-section



Base cross-section of M-FPC and B-FPCs



April 24, 2024

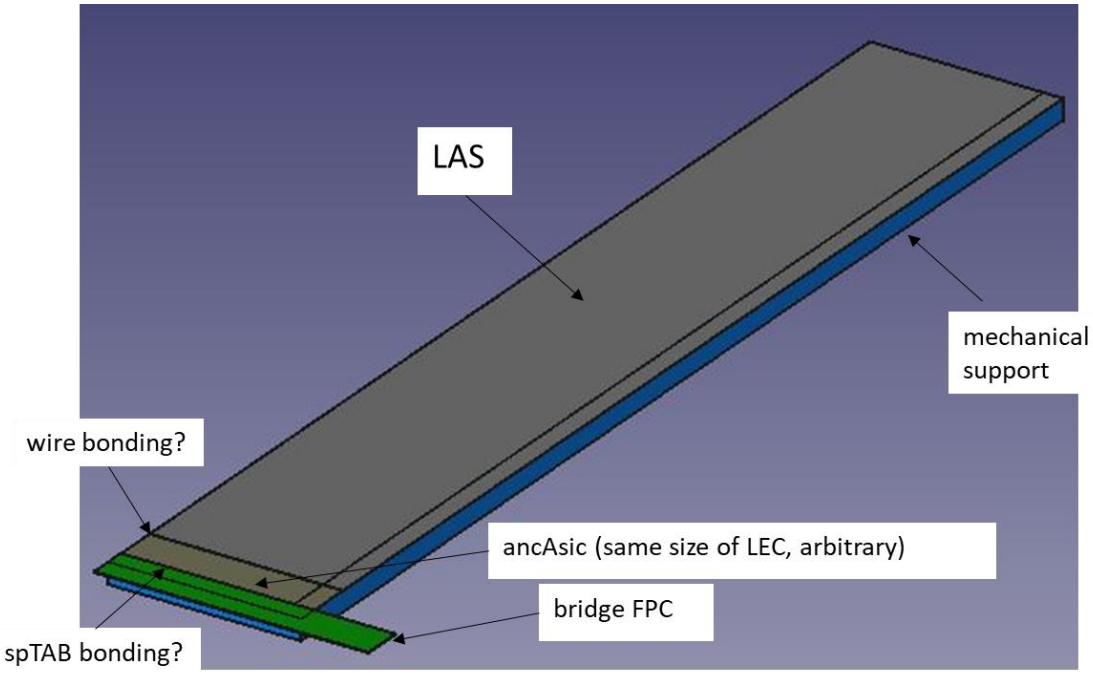
viatcheslav.borshchov@cern.ch, ihor.tymchuk@cern.ch

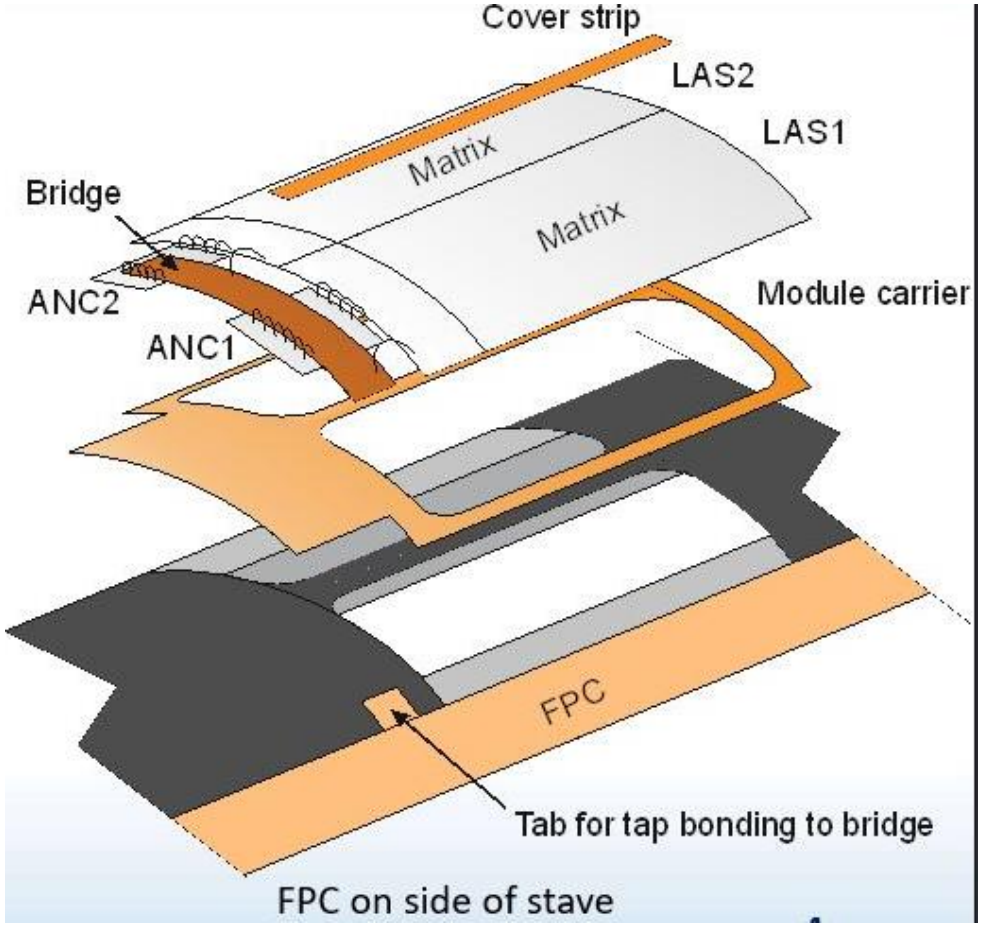
Science and Technology Facilities Council

Module (a.k.a. HIC)

Science and Technology Facilities Council

Module based approach to OB stave





Science and Technology Facilities Council

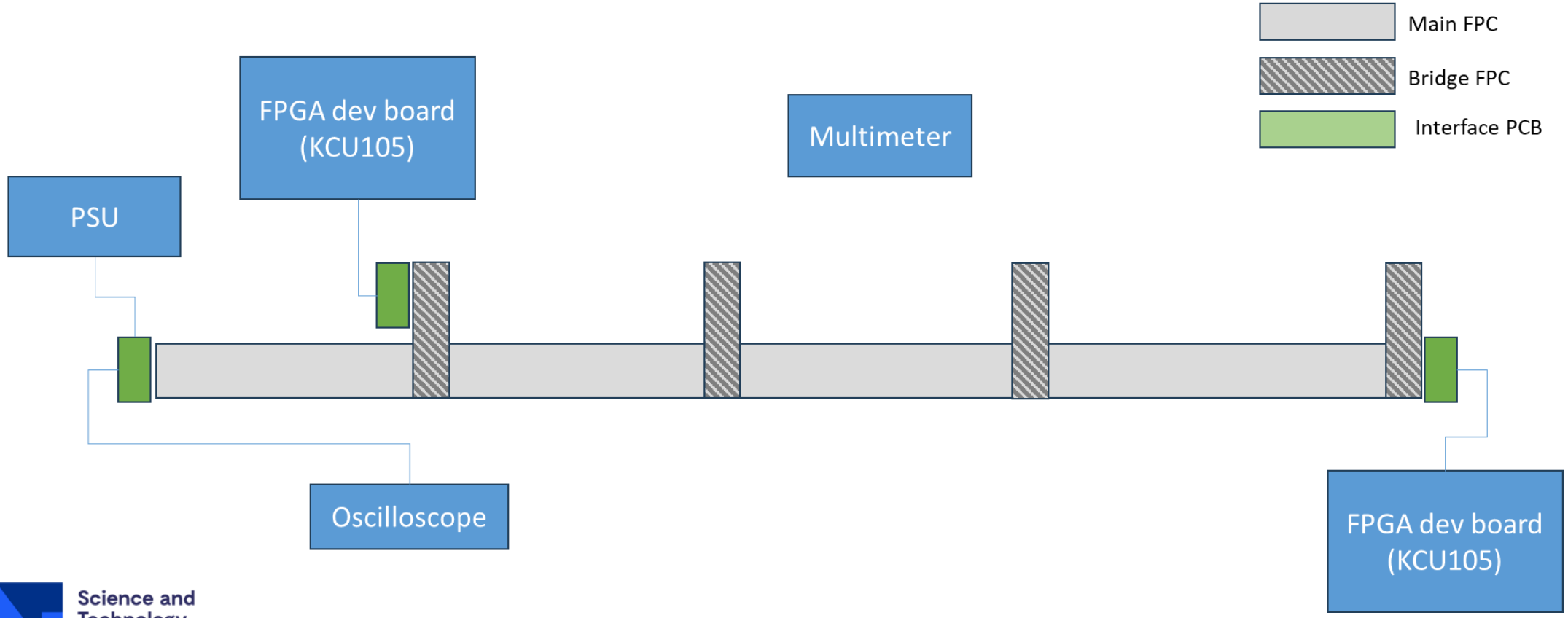
marcello.borri@stfc.ac.uk

1st low TRL prototype

Science and Technology Facilities Council

Test set-up

Sketch of test set-up



Science and Technology Facilities Council

marcello.borri@stfc.ac.uk

Conclusion

- The definition stage of a Low TRL prototype (OB L4 stave) was based on a snapshot of the project from ~Feb.2024;
- Design stage approaching completion, to be reviewed next week;
- Next: procurement and testing (w Oxford and LANL);

Science and Technology Facilities Council

marcello.borri@stfc.ac.uk

Science and Technology Facilities Council

Thank you

Facebook: Science and Technology Facilities Council

Twitter:@STFC_matters

YouTube: Science and Technology Facilities Council