Wafer prober system
(for MOSAIX/LAS testing)

Information from Ivan Camos Cali's (talks at SVT and SVT-WP2 meetings and individual discussions)

Liliana Teodorescu, 16.07.2025

System developed at CERN (SVT MIT group and others) in collaboration with ITS3

It is designed to be general purpose (to be used at different wafer probe sites)

The group will commission the system before it is distributed to other sites

System components (wafer prober test system)
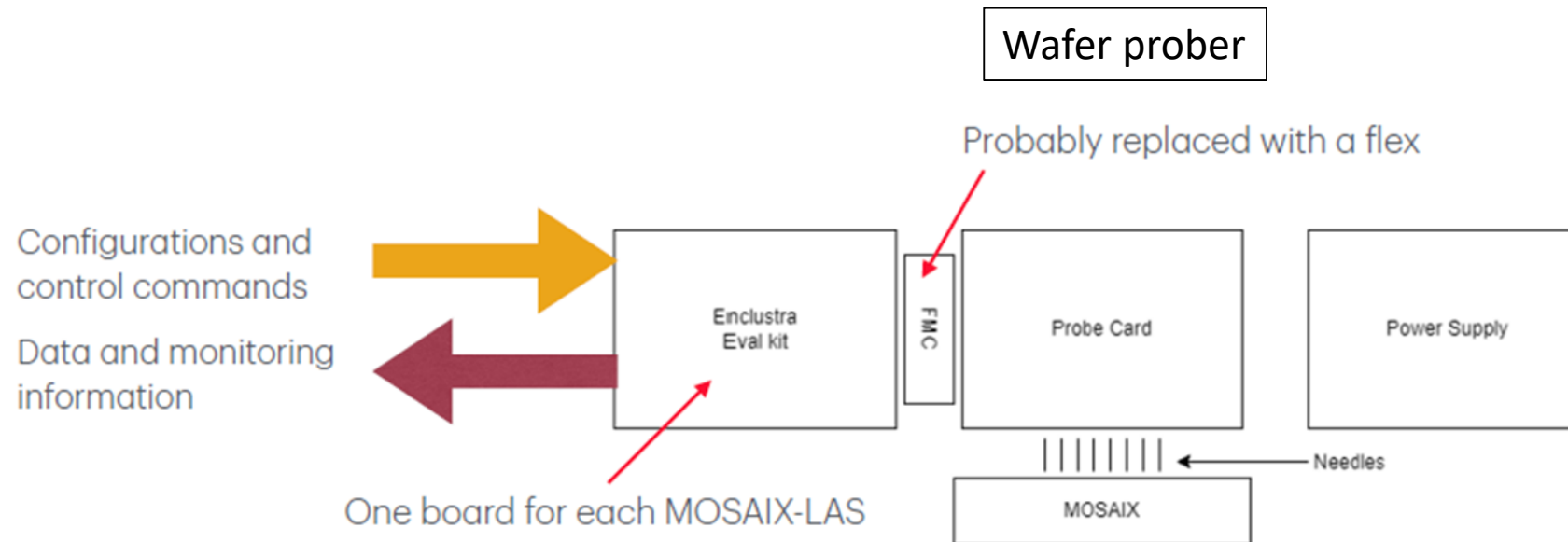
Wafer probing station

From MPI Corporation
Model MPI TS-3500 SE (Automated test system)

Key specifications:
• load up to 300 mm (12") wafers
• Micro-holes (200 um) chuck for thin wafers handling
• RF setup with possibility to test up to 110GHz and beyond
• Several cameras installed
• Automatic Probe To Pad Alignment compensation
• Extended probe card holder

Our status

Have the full specifications –from discussions with Ivan
Established contact with MPI
Requested a quote – waiting for the numbers

Delivery: lead time – 6 months (normally)
Installation and training – provided by MPI

Probe card - Under prototyping

MOSAIX and LAS will have 10.24 Gbps data links:
- Standard cantilever probe - limited at few hundred Mbps (cannot fully characterised the sensors)
- **Vertical probing** allows operation at > 10 GHz – technology has been validated with a prototype probe card

Time needed to characterize 1 MOSAIX/LAS:
- 12-24h if read out at low speed (160 Mbps)
- **0.25-1 h if readout at high speed (10 Gbps) (vertical probing)**

Different designs are investigated
  - Single point testing – one sensor at the time
  - Multipoint testing – 5 sensors **(only one design version can accommodate this for LAS)**
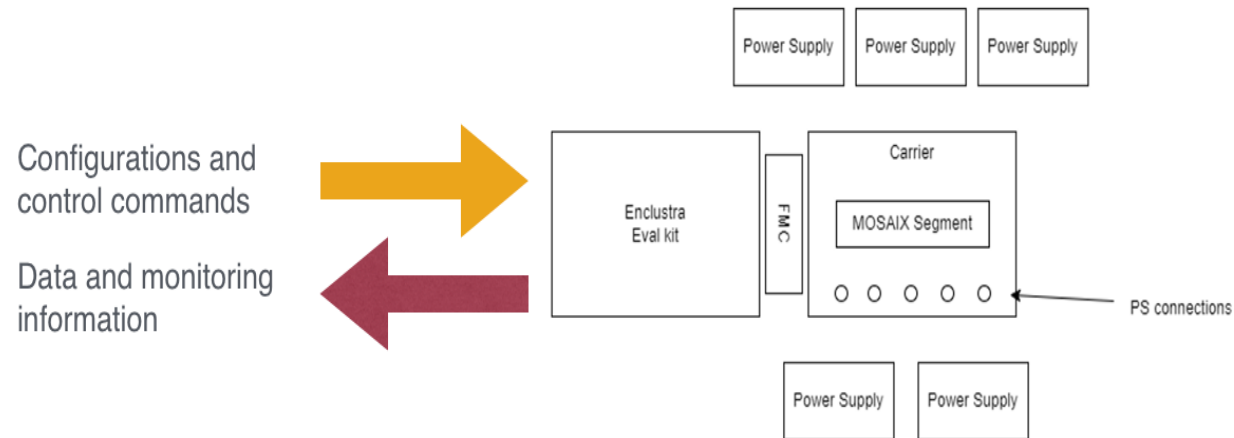
Plan
   - probe cards developed and validated at CERN
   - will be produce for all testing sites
   - sites with different wafer probers – will receive support but they will be responsible for compactivity

System components (wire bonded test system)

Same as before plus a carrier board

Carrier board - developed by CERN ITS3

Enclustra Evaluation Kit

- acts as control and readout system
- off the shelf commercial component
              Enclustra boards with Intel Arria 10 FPGA with the ST1+ board
- firmware developed by the ITS3 team in collaboration with some SVT members

One kit per sensor
For multipoint (5) testing - 5 kits needed

Power supply
   - off the shelf components
    - one channel per sensor => 5 channels for multipoint testing =>
         2-3 power supplies needed, depending on the number of channels

Measurement equipment
   - depends on the measurements to be done
  - possibly voltmeters to be needed if impedance measurements will be performed