

Silicon Tracking Status
SIT, SET, ETD
Mokka and digitization driver

ILD DETECTOR-OPTIMISATION

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Silicon Tracking Status **SIT, SET, ETD** **Mokka and digitization driver**

Goals of the SiLC (Silicon Tracking for Linear Collider) collaboration

- Performance studies of the silicon tracking components as defined in the LOI baseline of the ILD Concept using the full detailed GEANT4 based ILD simulation.
- Develop a tool to facilitate further optimisation studies
- Provide drivers for the ILD concept and the CLIC detector project.
- Find the “best” silicon tracker configuration through full simulation/reconstruction

Leading ideas when developing this driver => make it such as it is

- Easy to modify (flexibility) the detector geometry (modify the Si modules, false vs true double-sided sensors...) → dynamical aspect
- Possible to introduce mis-alignment studies according to the mechanical structure
- Possible to study materiel budget effects

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Reminder:

- New design pattern defined in 2010 and including the full geometry for the Silicon Tracking Components as developed by SiLC for the LOI baseline.
 - Default parameters defined the ILD concept LOI baseline (SIT/SET/ETD/FTD)
 - More flexibility = fewest fixed parameters
 - creation of sub-detector families
 - sub-detectors configuration
 - cross setup
 - Different input
- Actually in MOKKA trunk version

- Mokka drivers improvement and the digitizer development (Z. Drasal)
 - sub-detectors debugging and support builder
 - Enabling/disabling support
 - Gear implement → “serialization”
- On our local server
Next Commit in Mokka

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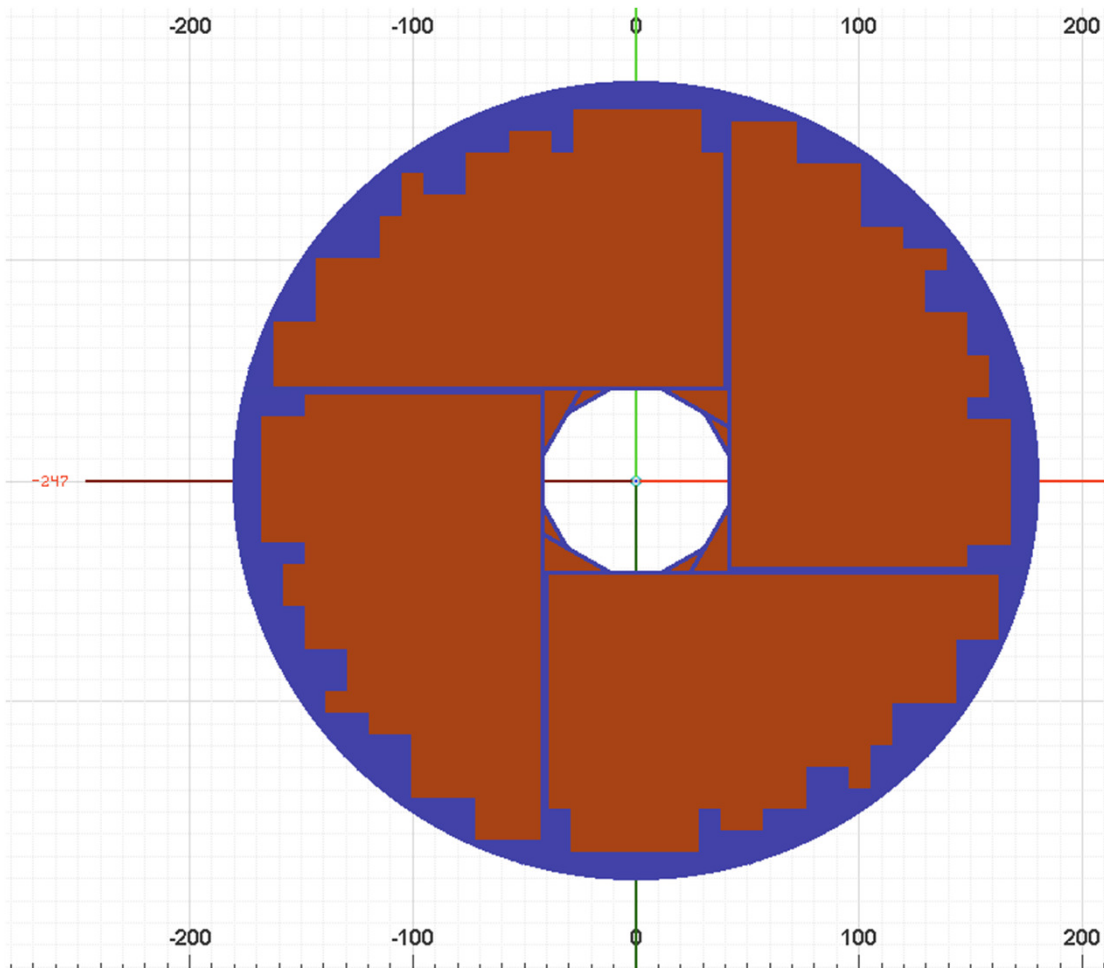
ETD Mokka/GEANT4 Drivers

- ETD drivers status (XUV-LOI baseline)
 - Dimension values given in Letter Of Intent (if modification in the dimension, please inform us)
 - Based on edgeless microstrip sensors
 - The XUV baseline solution also includes pixels at small angle
 - Preliminary Support is included (far from an optimised solution – building light large area Si tracking support continues to be part of our R&D objectives)
 - XY geometry is also available for further tests beyond the XUV LOI baseline.
 - No internal overlapping detected in the default configurations
 - No overlapping with other sub-detectors (within 1 micron) – if any detected, please contact [Alexandre Charpy](#)

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ETD Mokka/GEANT4 Drivers

- XUV coverage

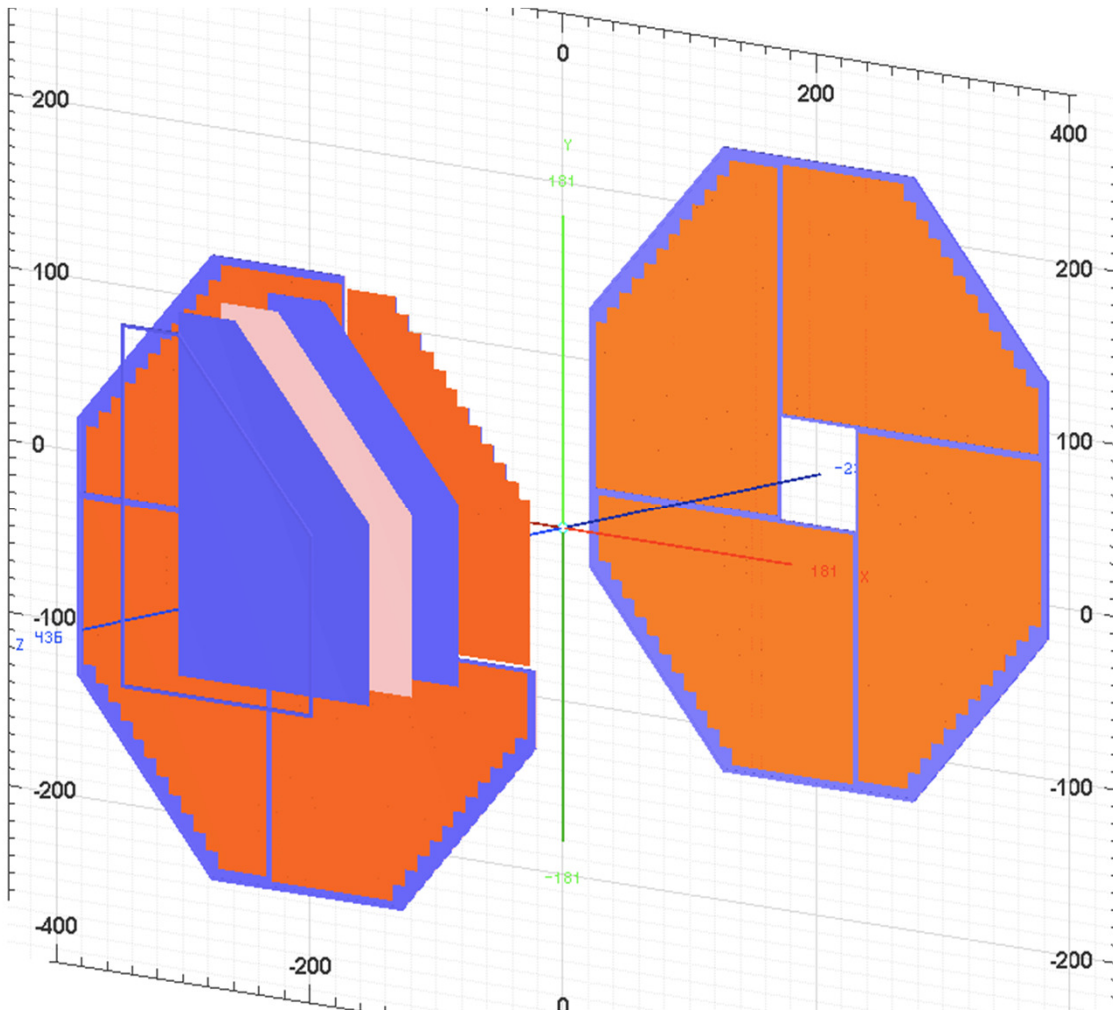


- Each ETD include 3 layers of single strip modules
- Angle between layer: 60°
- Common support (carbon fiber, honeycombed G10) – not optimized (work in progress)
- Pixels detectors at forward rapidity

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ETD Mokka/GEANT4 Drivers

- XY geometry for further tests beyond the XUV-LOI baseline

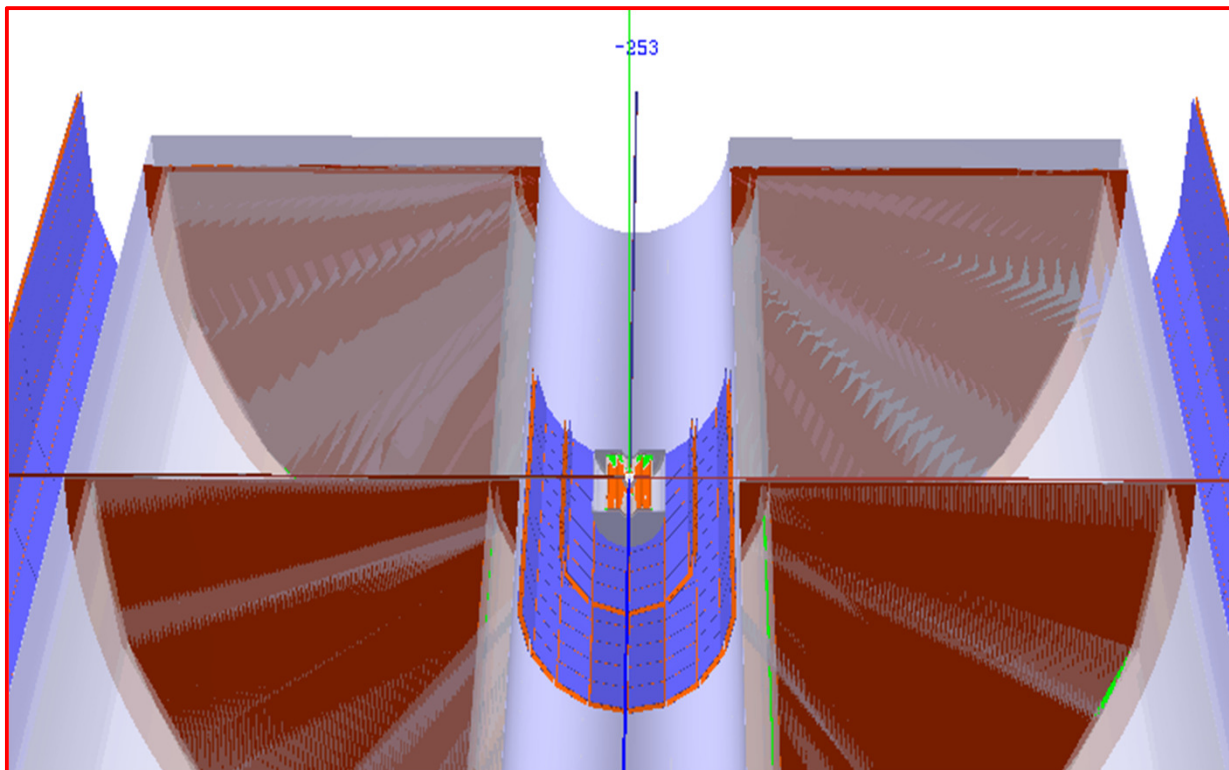


- For further tests, 2 layers of single strip modules are made available
- Angle between layers: 90°
- Common support (carbon fiber, honeycombed G10) – not optimized (work in progress)

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SIT Mokka Drivers

Full support is under development and a version will be achieved towards the end **of week 29** in 2011



SIT baseline (ILD LOI) is made of two layers based on false » DSSD sensors.

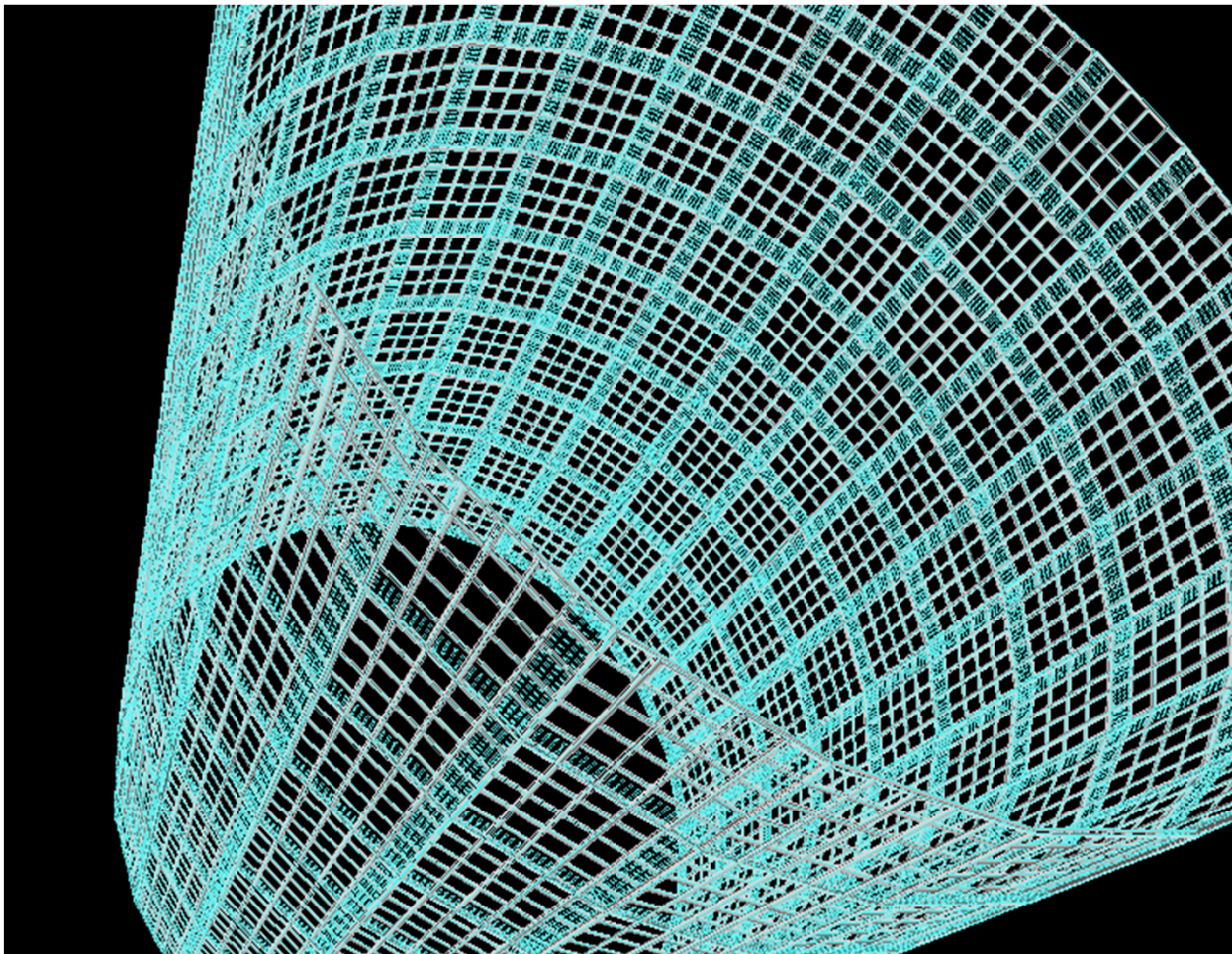
Moreover the use of true DSSD sensors is under consideration and this case will be included as option for further studies.

Gaps: 50 microns gap between modules, super module, gap between Detection Element → dead zone

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SET Mokka Drivers

Preliminary version of the SET support will be achieved at the beginning of week 30 in 2011



SET (baseline):
One layer of false DSSD sensors

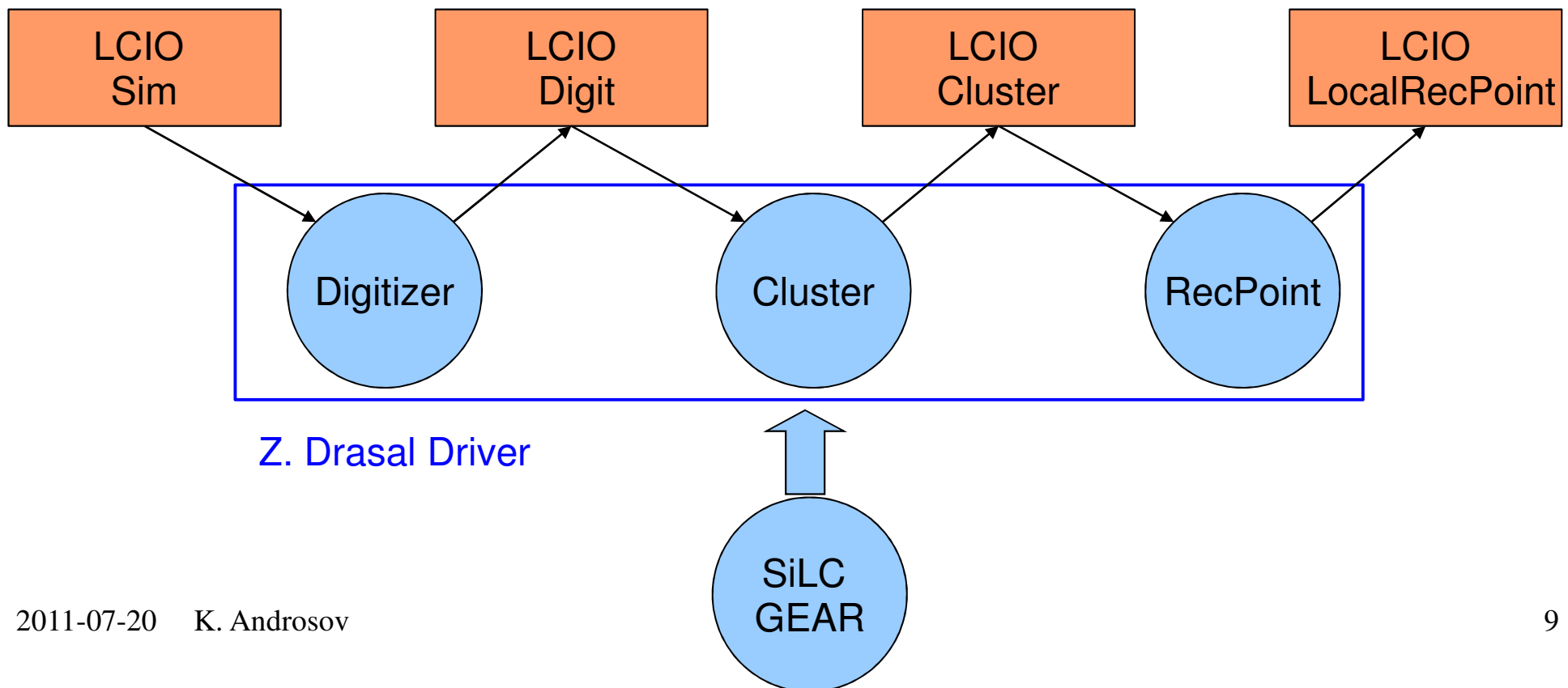
Gaps: 50 micron gap between
modules, super module,
gap between Detection Element
→ dead zone

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GEAR-digitizer-reconstruction drivers

The Digitizer is **under development**:

- Our starting point is the driver developed by Z.Drasal
- We modify and link it to the SiLCGear

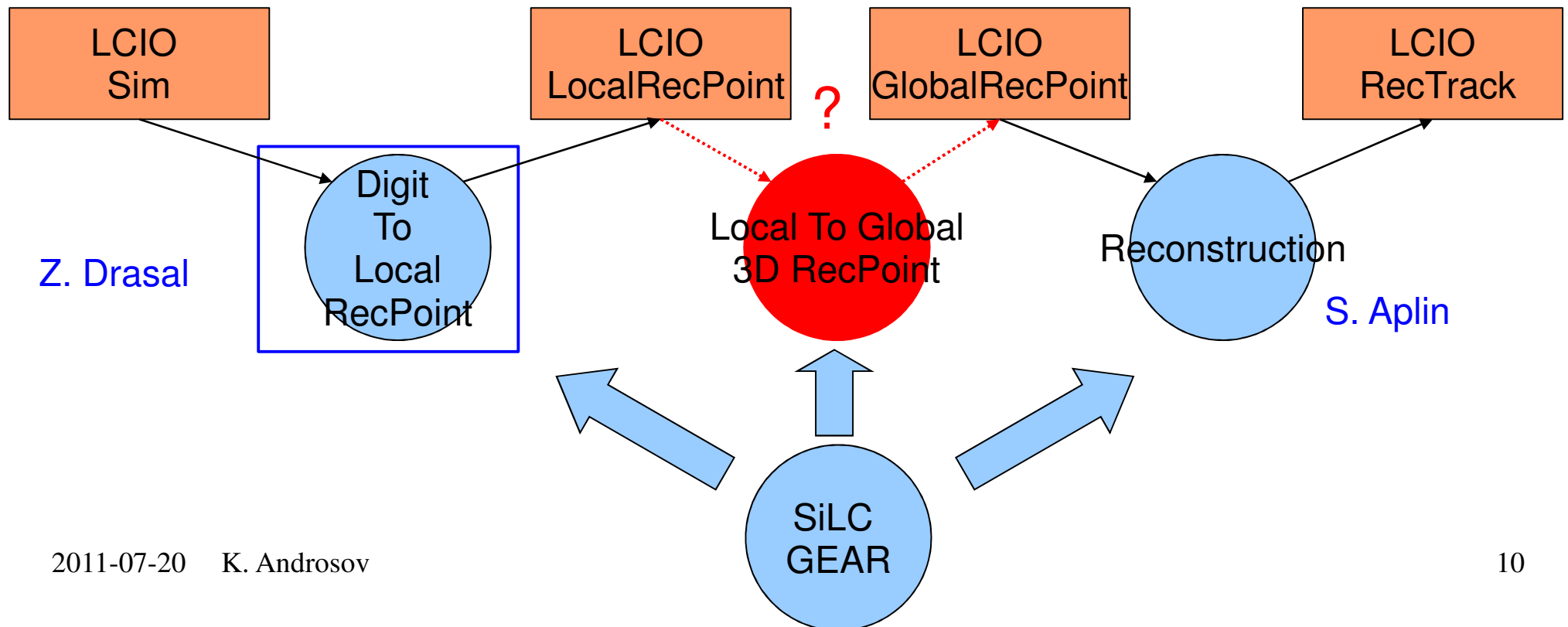


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GEAR-digitizer-reconstruction drivers

Following discussion with Steve and Zbyneck: **Ongoing discussions & exchanges**

- we need to add one driver to project local reconstructed point to the global reference
- are the SimTrackerHits and the TrackerHit containing all the required information ? What is the full format ?



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Current concluding remarks

Work is actively going on and we are making lot of progress:

- Next version of the Mokka driver is being commit soon
- GEAR driver: SiLCGearSerialiser development
- Digitizer driver from Z.Drasal is under adaptation
- Completing the Digitizer driver is in progress and under discussion with S.Aplin
- What is needed to complete these tasks, apart from some more time: some documentation and also pursuing the ongoing meetings and discussions with Steve and Zbyneck to complete these tasks.

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