LDG/ECFA Detector R&D Infrastructure Panel DRD Requirements & Lab Resources Survey Reports

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LDG/ECFA Detector R&D Infrastructure Panel

- To assist the DRD's with infrastructure resources needed for detector R&D that are not available within the DRD's themselves
- Availability either in big National Laboratories (LDG) or Institutes/Universities throughout Europe (ECFA)
- Panel composed of ==========➔
- First step: two surveys
  - Identify the *needs* of the DRD communities
  - Map out the *availability* of relevant resources in Europe
- Two sub-committees formed to execute these surveys
- First report on the DRD Survey in November P-ECFA
- This report focuses on the Labs Survey

Stan Bentvelsen (Co-chair)	Nikhef
Marko Mikuž (Co-chair)	Ljubljana
Karl Jakobs	Ex-officio - ECFA
Dave Newbold	Ex-officio - LDG
Phil Allport	Ex-officio - EDP
Joachim Mnich	LDG - CERN
Achille Stocchi	LDG - IJCLab
Ingrid Gregor	Germany
Mogens Dam	Denmark
Carlos Lacasta	Spain
Nadia Pastrone	Italy
Laurent Serin	France
Chris Parkes	UK
Jiri Kroll	Czech Republic
Rosemarie Aben	Nikhef

Reminder – DRD Survey Return

✓After some struggle, replies received from all DRDs:

- **DRD1 Gaseous Detectors**
- **DRD2 Liquid Detectors**
- **DRD3 Solid State Detectors**
- **DRD4 Particle ID and Photon Detectors**
- **DRD5 Quantum and Emerging Technologies**
- **DRD6 Calorimetry**
- **DRD7 Electronics**

- Results available on November P-ECFA Indico.
  - "Digested" version of the survey appended to agenda.
- 43 questions answered
  - Time invested in filling out the survey typically more than 1 hour.

 Thanks to all DRD's for participating and providing valuable input!

Detector R&D Infrastructure <–> EURO-LABS

- Currently, Detector R&D is sponsored by two Horizon Europe projects
  - AIDAinnova – Joint Research & Networking Activities (HEP Detectors exclusive)
  - EURO-LABS - Transnational Access (TA) to Research Infrastructures (47 RIs – joint venture with Nuclear Physics and HEP Accelerators)
- EURO-LABS WP4 (Access to RI for Detectors) comprises 11 RIs: 3 Test Beams, 2 Detector Characterization and 6 Irradiations
  - Running for 4 years 2022-26 (good overlap with AIDAinnova 2021-25)
  - Budget ~4 MEUR
- Even with the DRDs now in place vital to keep such TA scheme alive
  - Access to RIs free of charge for the detector R&D teams
  - Facilitate especially prospective (blue-sky) and guided R&D where funding is scarce
- New EC infrastructure call for TA in sight for the next period beyond 2026
  - Likely that funding will decrease ☹
- All 11 RIs were explicitly offered as an infrastructure resource to DRDs in the survey
  - Heavy demand of all of the RIs offered among DRDs

EURO-LABS
EUROPEAN LABORATORIES FOR ACCELERATOR BASED SCIENCES

https://web.infn.it/EURO-LABS/

DRD Survey Wrap-Up

- There is a clear request to the LDG (and beyond) to provide infrastructure not present within institutes participating in DRD's.
- EURO-LABS facilities provide a good starting point although do not exhaust the DRD wish list.
  - Some additional test-beam and irradiation facilities mentioned.
  - Mechanics, electronics (except ITAinnova) and software not part of EURO-LABS at all.

Lab Survey

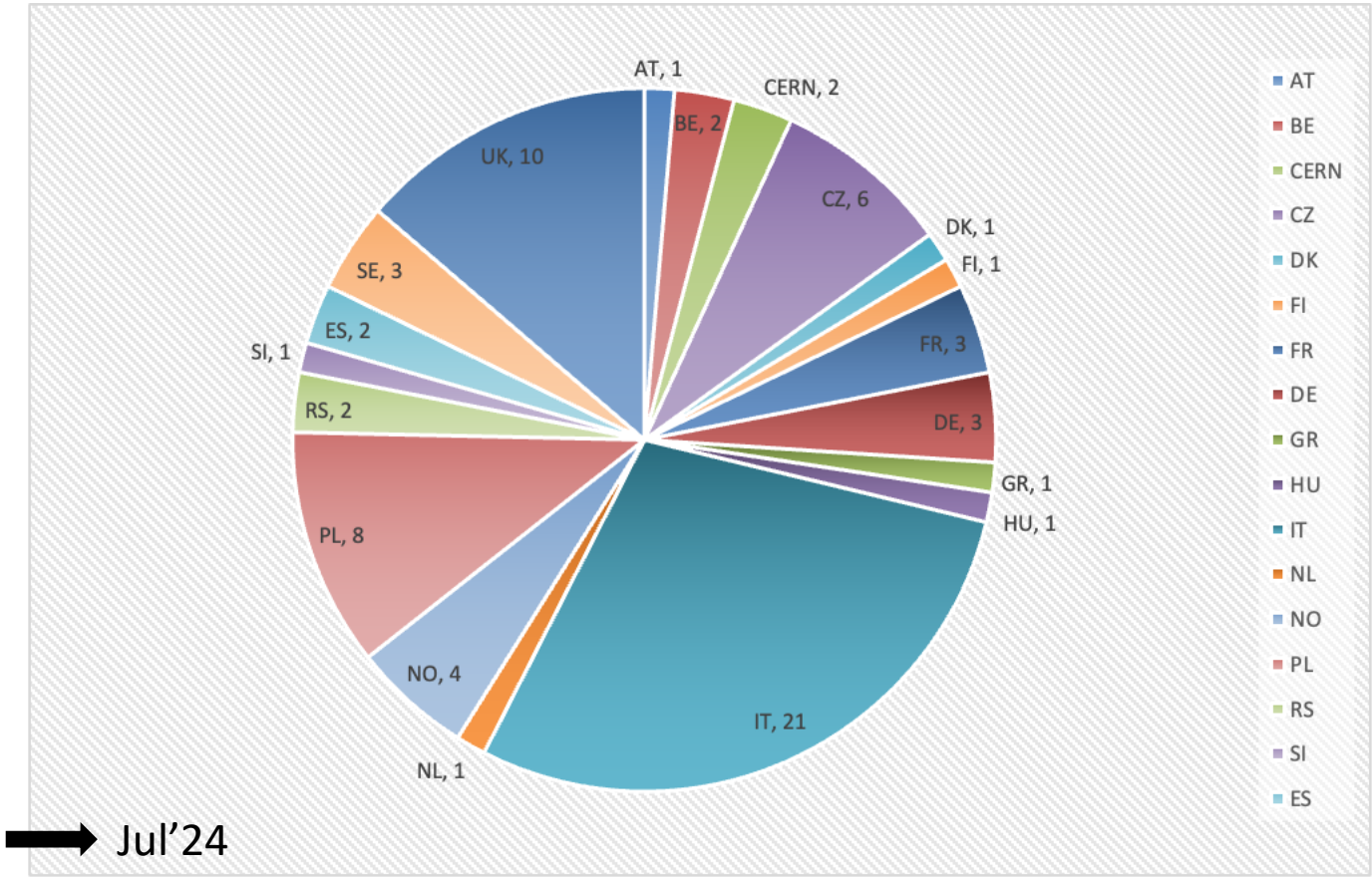
- Lab role in the General Strategic Recommendations of the Detector R&D Roadmap
  - GSR 1 - Supporting R&D facilities
  - GSR 2 - Engineering support for detector R&D
  - GSR 3 - Specific software for instrumentation
  - GSR 5 - Distributed R&D activities with centralised facilities
- The survey aims to gather information and potentially seek a match with DRD needs
  - Can optimize the Detector R&D efforts and potentially provide new funding opportunities to the (national) labs.
- Survey structure
  - Test-beam and Irradiation facilities
    - Existing facilities
    - Plans and ambitions
  - Characterization and test-bench measurement facilities
  - Local expertise, status and ambitions/plans
    - Electronics expertise
    - Mechanical expertise
    - Software support

Responses Collected

- Responses collected until latest PECFA meeting
  - Replies from **47** labs in **12** countries
  - We lacked pan-European coverage
    - ECFA covers **28** countries!
- Survey extended with active role (arm-twisting) of RECFA members
  - Now data from **73** labs in **19** countries
  - Decent turnout
    - Still some missing (e.g. CH)

BE	1
CH	1
CZ	6
DE	1
DK	1
FI	1
FR	2
IT	**21**
NL	1
NO	1
SE	2
UK	9

Nov'23 → Jul'24

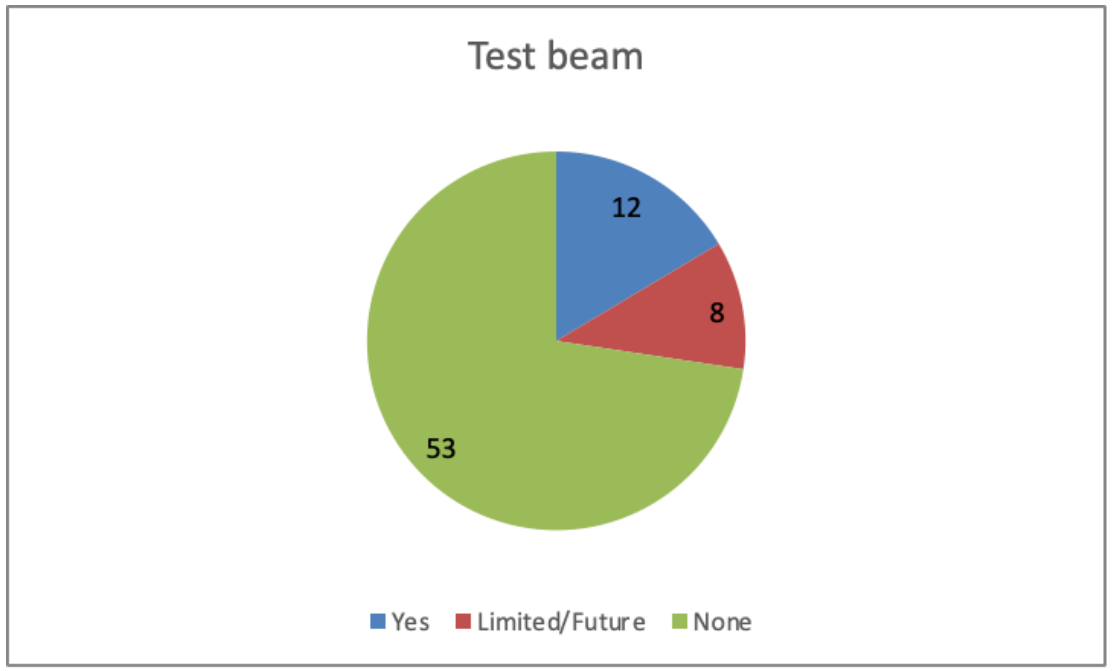


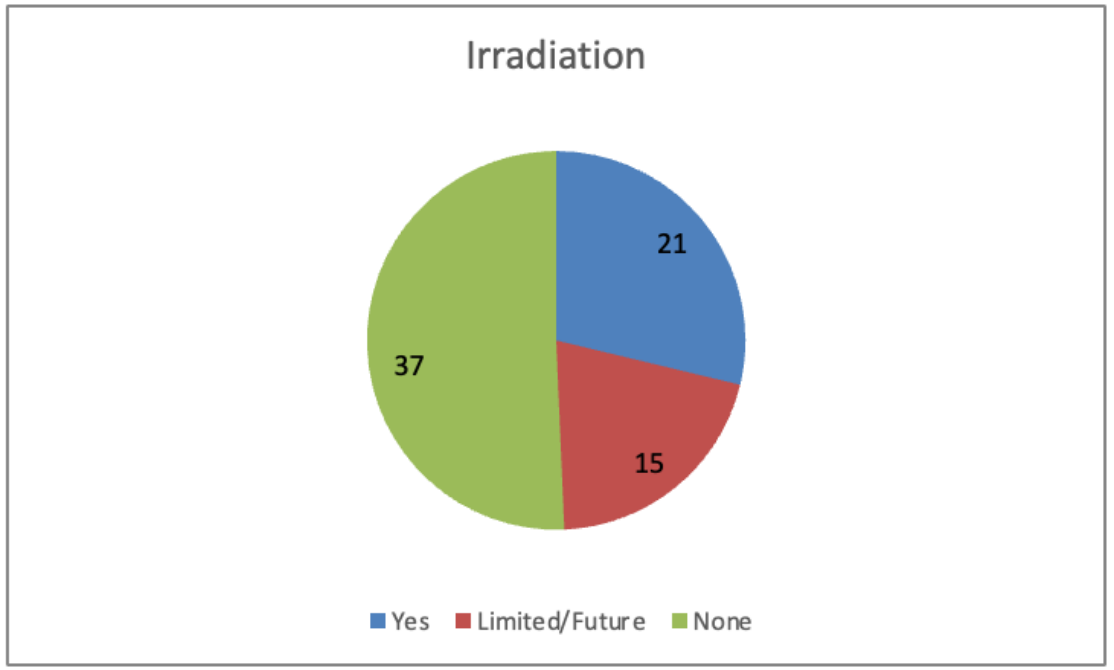
Attempt of a Quick Analysis

- The responses are fed into a Excel sheet.
- Mixed structure of (multiple) choice, numerical data and comments in the table fields.
  - Difficult to analyze, but very instructive as information on European lab resources!
  - No real support from the survey team for the analysis, so done rather superficially by me (apologies in advance).
  - Still maps out the lab landscape sufficiently to be shown.

Lab Analysis – Test beams and Irradiations

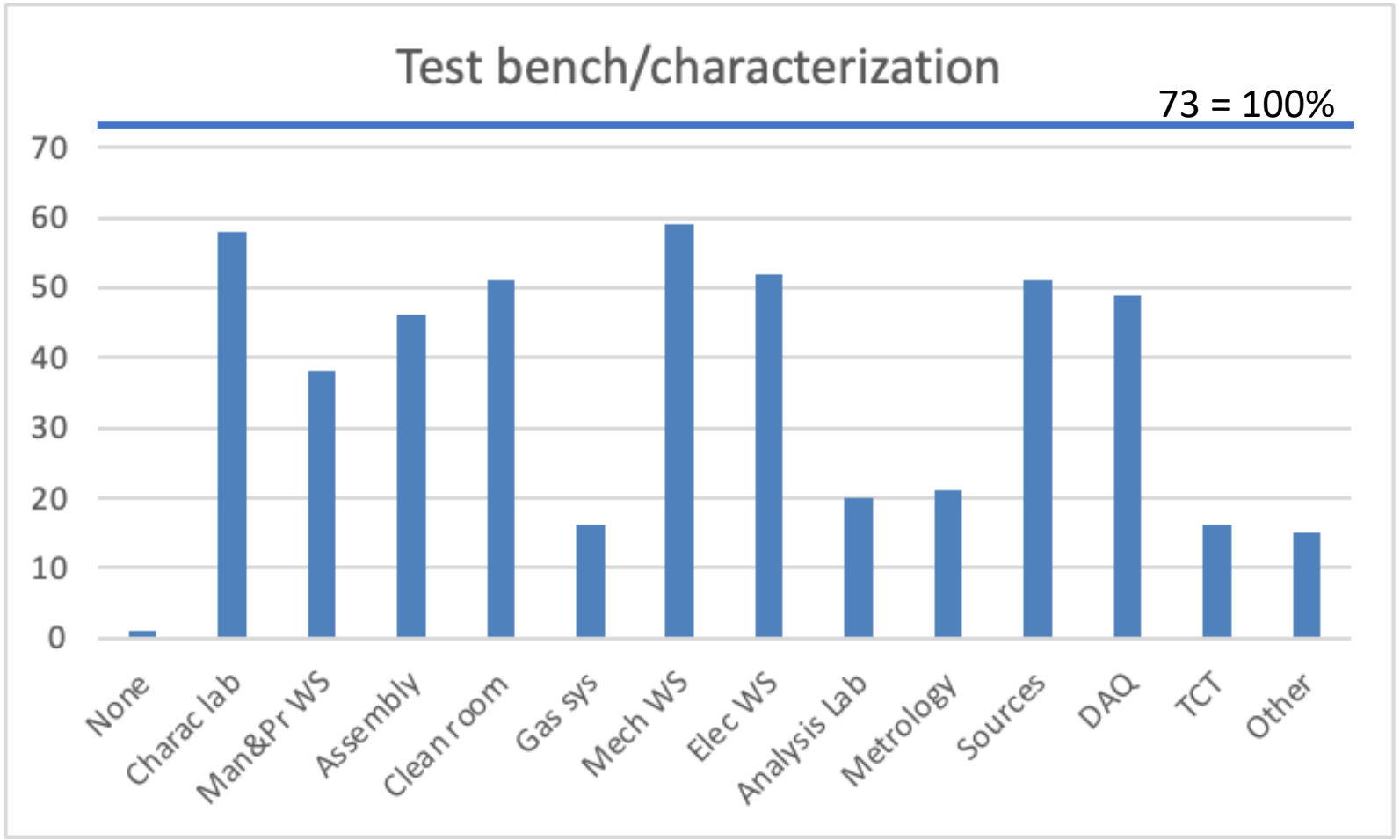
- Two of the resources, most requested by DRD's
- Show sheer numbers, table contains detailed info on actual facilities.





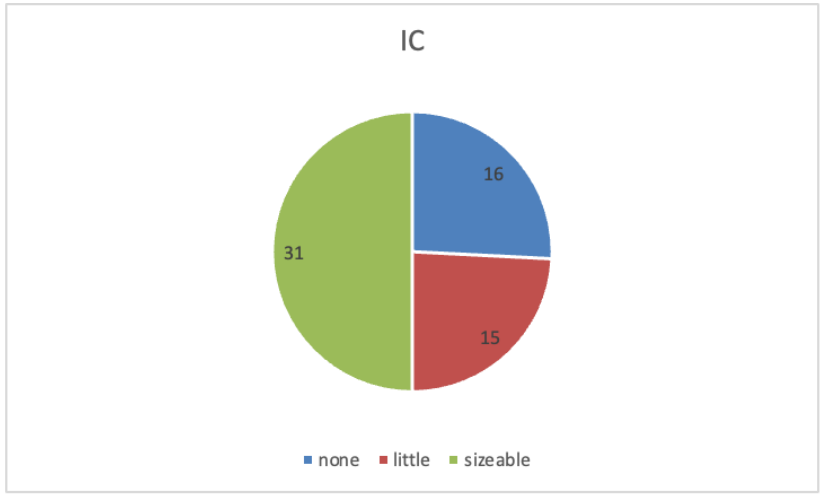
Characterization and Test-Bench Measurement Facilities

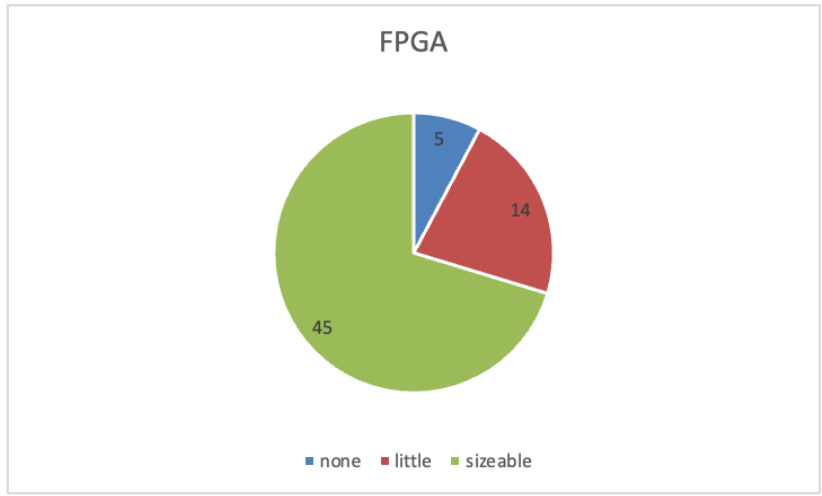
- Almost all labs have those.
- Do they really go beyond those already present in DRDs??

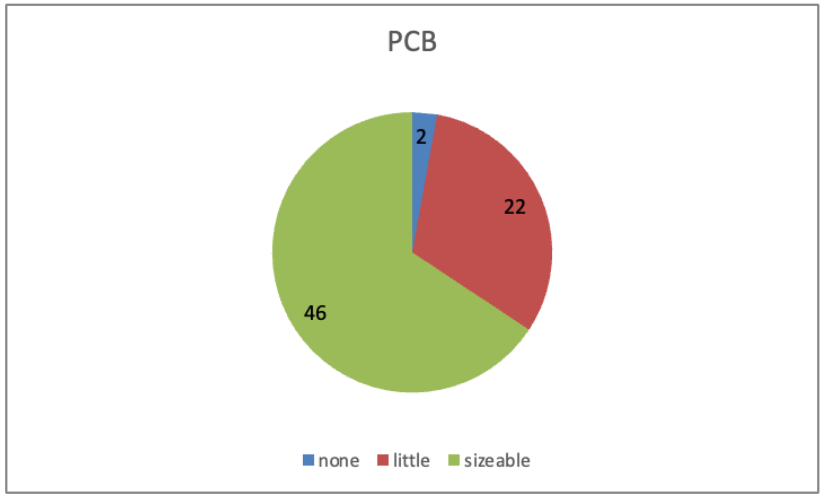


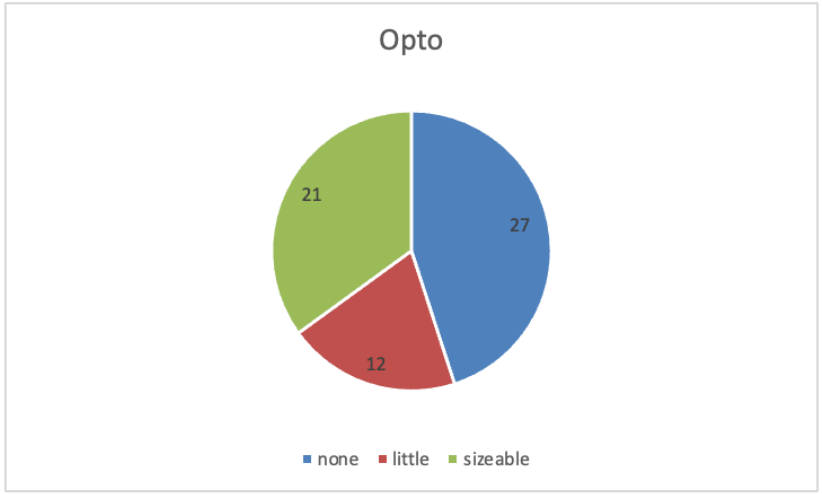
Lab Analysis – Electronics Support

- Structured in terms of
  - IC design
  - FPGA design
  - PCB design
  - Optical fibres
- In addition
  - “other” support
  - head count
  - comments



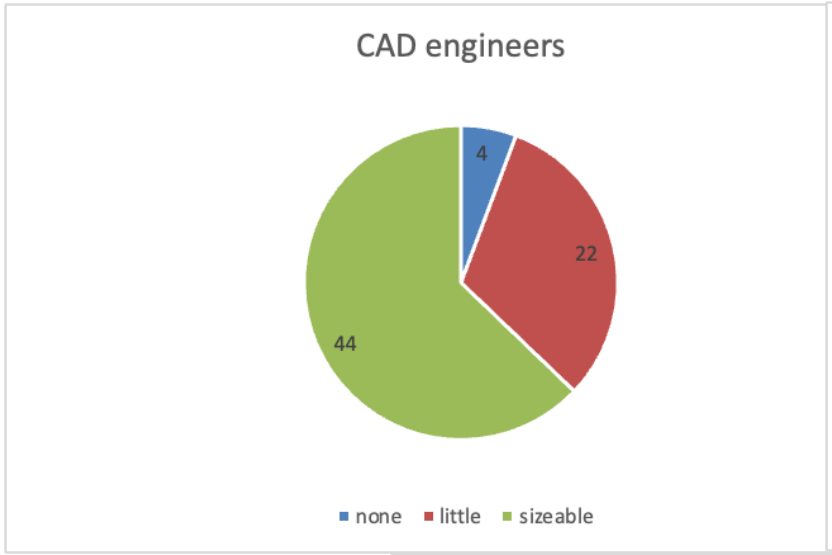


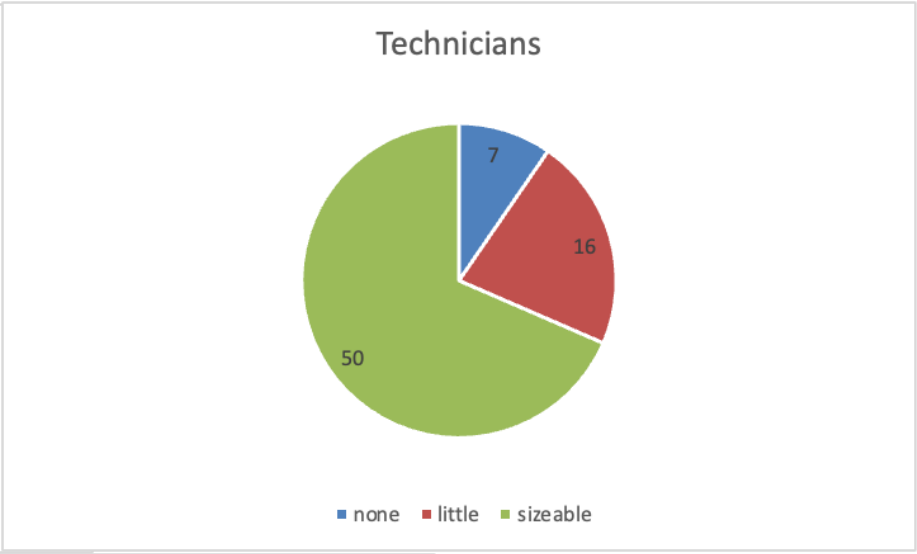


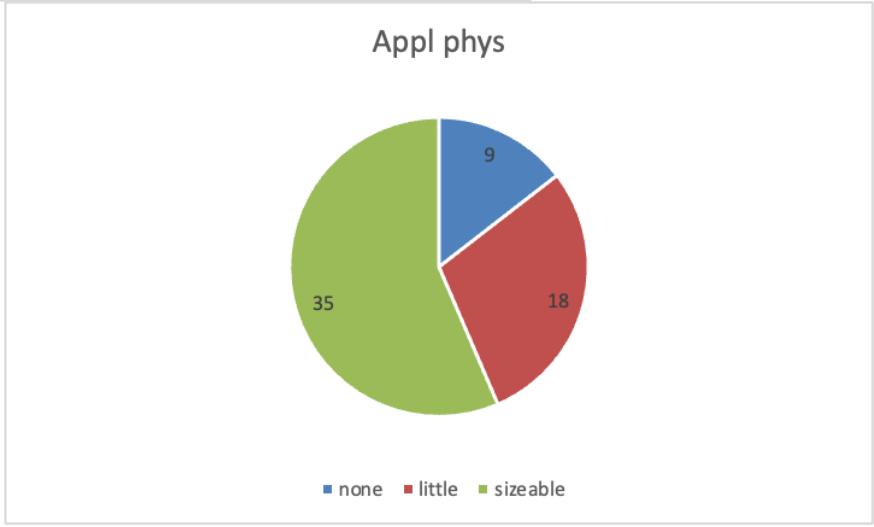


Lab Analysis – Mechanics Support

- Structured in terms of
  - CAD design engineers
  - Technicians
  - Applied physicists
- In addition
  - “other” support
  - head count
  - comments

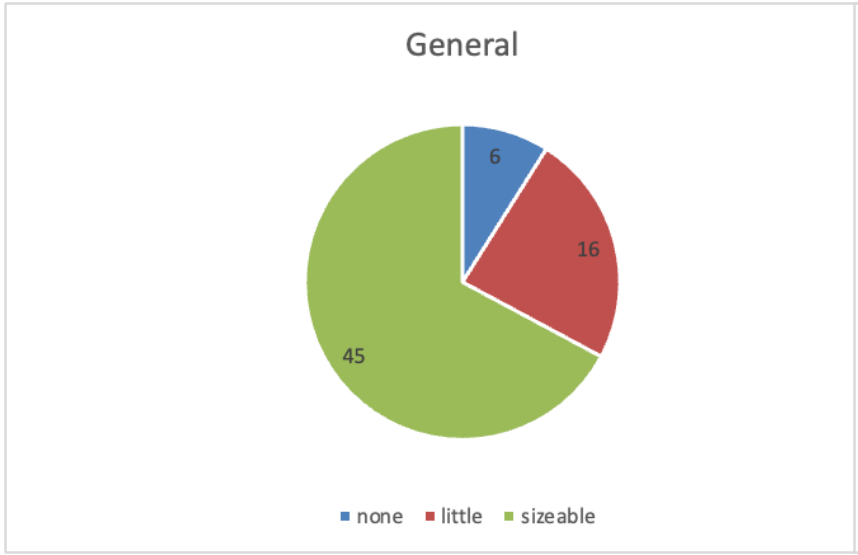


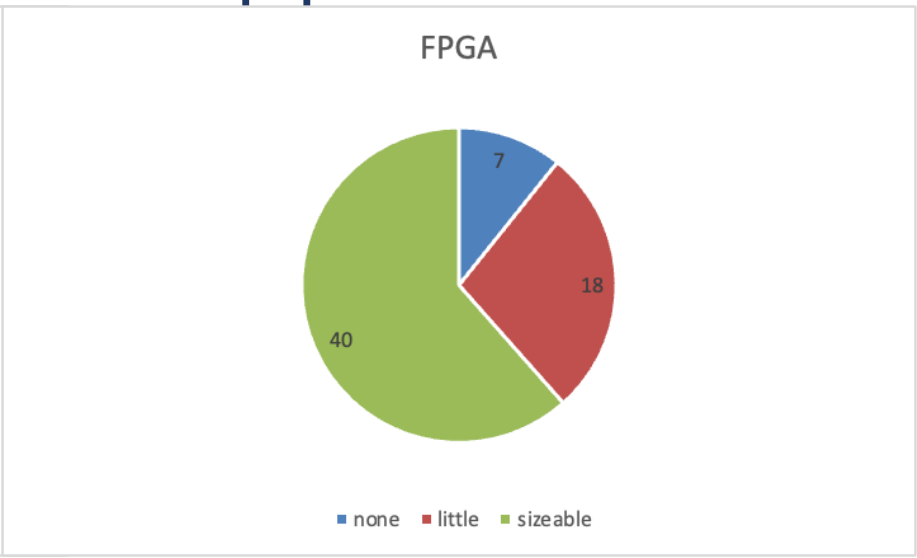


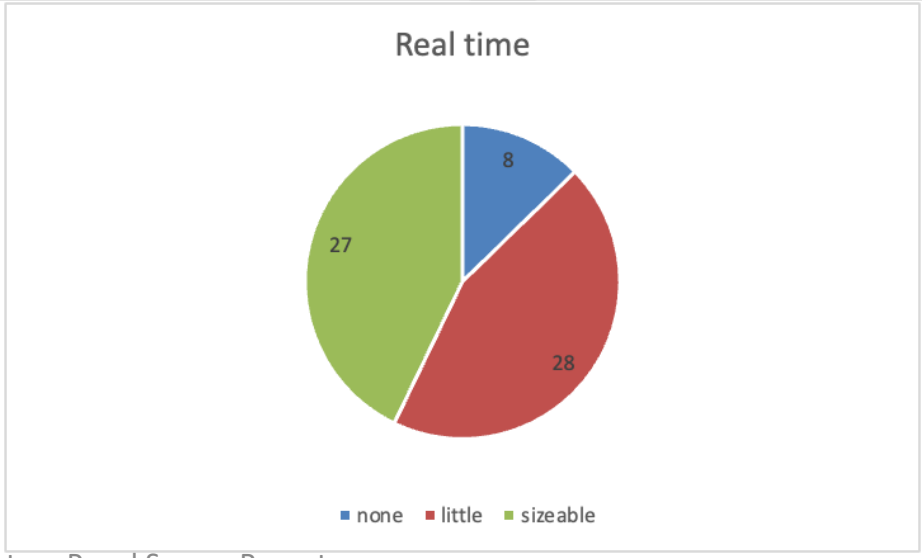


Lab Analysis – Detector Software Support

- Structured in terms of
  - General software
  - FPGA
  - Real time
- In addition
  - “other” support
  - head count
  - comments







Follow-Up – My Personal View

- Lab survey data contains valuable information on available resources for Detector R&D.
- The ambition of “matchmaking” looks overambitious to me…
  - The best I can see is restructure the excel sheet into a more readable form (not that important though).
- I’d propose the following bottom-up approach:
  - Ask lab contacts to consent to publishing their lab info on ECFA pages.
    - and provide web resources to complement existing info
  - Provide (digested?) lab info with respective contacts to enable DRDs to approach the sought resources directly.
- We still want to monitor the DRD <-> lab interactions
  - Report of DRDs –> DRDC ? Report of labs –> Panel ? RECFA member ?