

# BTTB Forum: Beam telescope 202x

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# Future Opportunities for TB @ DESY workshop

- <https://indico.desy.de/indico/event/17998/>
- White Paper “User demands and possibilities”

## Status

The EUDET-type pixel beam telescopes are a key instrumentation at DESY and at other test beams worldwide. They are in very high demand. The telescopes are one of the very few examples of beam telescopes that are used by many different users from various experiments. Their success is not only possible thanks to their excellent hardware but also because a central DAQ package (EUDAQ and its successor EUDAQ2) and a reconstruction software package (EUTelescope) are provided, which are maintained by an active developer community currently supported strongly by DESY. The telescopes and other infrastructures like the PCMAG solenoid have been strongly and continuously supported by EU projects starting from EUDET till AIDA2020 [4].

## Test beams at DESY 2019-2014

In terms of instrumentation it is clear that significantly higher rates require new beam telescopes to take advantage of it. Besides a higher rate capability, a precise hit timing for the telescopes was requested by the user community. This can be realized by a dedicated timing layer added to the telescopes or a telescope with new sensors that provide precise time stamping for all the particle hits. Since fast timing is required by several groups also without using a telescope, it was suggested, whether such a system could be provided centrally. Ideally, such a system would provide a timing resolution at the 20-50 ps level. The idea here is to repeat the success of the EUDET-type telescopes by providing a standardized timing layer instead of many individual solutions. Finally, having a common cold box available at the Test Beam was suggested. This is regularly required, when irradiated sensors are being tested and could reduce the problems individual groups frequently encounter when they are setting up their cooling solutions at DESY.



## Preliminary outcomes

- whole package preferred (Tscope, DAQ, Reco FW)
- user support
- High rate capability
- Timing (layer): 20-50 ps

→ Re-evaluate at BTTB WS

# Lessons learnt -- DESY's view

## What was good?

- Common infrastructures has enabled detector R&D
- Mimosa26
  - Excellent spatial resolution
  - Low material budget
    - usable at DESY and CERN
- A common DAQ (EuDAQ)
- TLU + defined TLU interfaces
- Central coordination, user support and user-driven development
- Community interaction
  - BTTB
- Steering in work packages, e.g.
  - WP15.2: infrastructure for tracking
  - WP5: common DAQ

## What can be improved/need to be re-defined?

- Sensor/Timing
  - New technologies (faster, ...)
  - Radiation hardness ?  
(or ensuring safety)
- Flexible and robust mechanics
- Reconstruction SW
  - 'easy-to-use', or at least 'easy-to-start'
  - Scope of reconstruction software
- Interfaces
  - at DUT <-> TLU
  - at DAQ <-> Reco
- Manpower on software maintenance
- Documentation !!

# Discussion, Ideas, Collection of needs, AOB

- Sensor
  - faster technologies
  - long-term accessibility
  - ...
- “Central” device: TLU-like
- DAQ software
  - scope (EUDAQ-like, top-level)
  - maintenance
  - ...
- Reco. software
  - scope
  - maintenance
  - ...
- Backwards compatibility
- Management and Support
- Funding schemes ?
- Foundation of JRA ?
- Commitment ?  
It only works if people contribute to a joint effort, waiting for the JRA to solve your problem is not the idea