

- WP7 - Transnational Access to DESY Test Beam

This work package describes transnational access to the DESY test beam infrastructure. Travel support and subsistence for the users of the facility is requested from the European Commission. Operation costs are fully covered by DESY.

Work package number	WP7	Start date or starting event:						M13
Work Package title	Transnational Access to DESY Test Beam							
Activity type	SUPP							
Participant number								
Participant short name	D-TERA-DESY							
Person-months per participant	48							

Description of infrastructure
<u>Name of infrastructure:</u> DESY Test Beam
<u>Location:</u> Hamburg, Germany
<u>Web site address:</u> http://www.desy.de Detailed information at http://testbeam.desy.de
<u>Legal name of organisation operating the infrastructure:</u> Deutsches Elektronen-Synchrotron
<u>Location of organisation (town, country):</u> Hamburg, Germany
Annual operating costs (excl. investment costs) of the infrastructure (€): 370000
<u>Description of the infrastructure:</u> <p>DESY presently operates at Hamburg several particle accelerators of worldwide relevance. The largest facility, HERA, provided collisions of 920 GeV protons with 27.5 GeV electrons between 1992 and 2007. DORIS is an electron storage ring which previously was operated as e⁺e⁻-collider and is since 1993 exclusively used under the name DORIS III as synchrotron light facility. For both machines the DESY II synchrotron is used as pre-accelerator and delivers in parallel electron or positron beams for to up to three test beam areas using a fixed target. Access to these beam lines is the subject of the Transnational Access Activity discussed here.</p> <p>DESY II can provide electron or positron beams with an energy variable between 1 GeV and 6 GeV, a small energy spread of about 5%, and intensities of up to 5000 particles per cm² and second, depending on beam line and secondary target. Next to CERN which has beam facilities for even higher energies and different particles (hadrons, electrons, muon, and neutrinos) DESY is currently the only laboratory in Europe which can deliver high energetic particles in the multi-GeV range.</p> <p>The support for users requested in this proposal will foster and enlarge the continued use of this infrastructure upgraded in the EUDET project. Within this proposal access will be made available immediately following the end of the EUDET project (December 2009). The encouraging experience from EUDET demonstrates that there is the potential of further enlarging the user community to the benefit of detector research in Europe.</p>
<u>Services currently offered by the infrastructure:</u> <p>The test beam areas provide sufficient space for the installation of larger scale detector prototypes. They are equipped with huts to house data acquisition and control electronics, and data connections to the DESY computer centre exist. The beam areas are shielded providing working space for operators. Safety equipment is in place such that gaseous detectors can be used even with flammable gases.</p>

Translation stages are available for remote controlled positioning of test equipment in the beam lines. Within EUDET the infrastructure was equipped with a high field superconducting magnet, and a high precision silicon pixel telescope. The exploitation of these two items will be part of this TA project until they become part of the EUVIF installations at CERN (around month 36) whereas access to the DESY test beam as such lasts until the end of the project. A second telescope of medium precision is also available within the infrastructure, typically used for "proof-of-principle" studies.

This existing infrastructure makes the DESY II beam facility one of the few places in Europe where R&D for particle detectors can be performed. It has been extensively used in the past for the development of new detectors and prototype tests. In recent years the DESY test beam played an important role for the ILC detector R&D as well as for first studies within the LHC upgrade programme. Several groups performed experiments with calorimeter prototypes and small pixel detectors at the facility which contributed very significantly to the current state of this R&D effort. Many groups performed experiments with prototypes as well as calibration measurements with detector components which were later installed in the experiments. For example in the year 2007 in total 15 groups from 11 different countries accessed the DESY test beam facilities.

Description of work:

Modality of access under this proposal:

The DESY test beam coordinators, appointed by the DESY directorate, negotiate with the selected applicants the date and the length of access, in close cooperation with the User Selection Committee (see below). The typical length of access to the test beam is between one and four weeks with an average of about two weeks. The average size of user groups is about five researchers. Typical infrastructures used by groups in the DESY test beam are the telescopes, translation stages or trigger electronics. Once the groups are set-up in the beam area and familiar with the DESY safety rules the studies are conducted independently.

During DESY operational periods the beam is available at the experimental areas for about 50% of the time. The remaining time is needed to refill the accelerator replacing the spent beam and to synchronize with the other accelerators on the DESY site. The overall dead time of 50% includes also all losses due to technical problems of the machine. The operation of the beam and therefore access to the test beam area is under the control of the experimenter.

Access to the DESY test beam facility will be provided free of charge.

Support offered under this proposal:

The DESY test beam coordinators are the contact people for the experimenter at DESY, and ensure the proper support of the experimenter during the time at DESY. This includes access to technical services, safety instructions, assistance during the setup up and dismantling phase. DESY provides access to shop services according to the standard conditions for DESY users, access to stores, office and IT infrastructure. The test beam coordinators also instruct and support the user in the use of the additional equipment such as the telescope or the superconducting magnet which were provided within EUDET.

User accounts for the central computing facilities are granted on request including internet access. A scientific library is on site. There are several guesthouses on the DESY site providing accommodations at cost price. External users are an integral part of the life and are invited to seminars and other scientific events at the laboratory. They profit from the highly international and stimulating atmosphere at the laboratory.

This TA activity will continue the successful TA to the DESY test beam of the EUDET project and thus will start beginning of 2010. TA users will be eligible for receiving travel and subsistence payment, financed by the community funding.

Outreach of new users:

The DESY test beam is in the international detector R&D community already well known as an easy to access reliable facility. Scientific results obtained were published at many conferences and in numerous journals, giving rise to higher recognition of this facility. Within EUDET an increase of applicants for test beam access was observed. Due to the broader scope of this proposal a further

increase of applicants is expected. Additionally the infrastructure will be advertised on the WEB and in suitable scientific media, at least once a year.

Review procedure under this proposal:

The SAB will play a central role as the User Selection Panel to grant transnational access to the test beam facility. It will evaluate the proposals and rank them into three categories (A: Approved, B: Approved, but on waiting list, C: Rejected) based on the scientific merit of the proposed experiment.

Implementation Plan

Short name of installation	Unit of access	Unit cost	Min. quantity of access to be provided	Estimated number of users	Estimated number of days spent at the infrastructure	Estimated number of projects
DESY test beam	TB week	11100	30	100	10 per visit and user	25

Units of access

The unit of access to this infrastructure is one week of beam time (TB week). This includes the preparatory work of the external group at the facility, assembling and disassembling of experimental set up as well as radiation and general safety briefings as required by local laws.

A TB week comprises 7 days of 24 hours access to the experimental installation. In general technical and scientific support is provided during normal working hours, i.e. 5 days a week for 8 hours during day-time. An on-call service is in place to assist in urgent problems at any moment. The DESY II accelerator is operated for approximately 10 month per year and the remaining two months are scheduled shut-down time when the facility is not available.

The TB week includes the time needed to assemble, test and disassemble the experimental set-up in the beam line. Depending on the complexity of the apparatus the installation and dismantling of the experiment may take several days during which the beam line is not available for other users.