

EUDET

Detector R&D towards the International Linear Collider



Status and Plans

Joachim Mnich

ECFA ILC Workshop

Vienna, November 2005

EU supported ILC related projects



SIXTH FRAMEWORK PROGRAMME
Structuring the European Research Area Specific Programme
RESEARCH INFRASTRUCTURES ACTION

- 2003 CARE: Coordinated Accelerator Research in Europe
Integrated Infrastructure Initiative (I3)**
- 2004 EUROTeV: European Design Study Towards a Global TeV Collider
Design Study**
- 2005 EUDET: Detector R&D towards the International Linear Collider
Integrated Infrastructure Initiative (I3)**

Description of EUDET



EUDET

- **is NOT a detector R&D programme in its narrower sense**
but provides a framework for ILC detector R&D with larger prototypes
- **does NOT cover all future needs (financial & human resources)**
additional resources required, e.g. to exploit EUDET infrastructures
- **is NOT a closed club**
other institutes (European & non-European) are invited to
 - **contribute to the development of the EUDET infrastructure**
 - **and to exploit it (→ Transnational Access)**

EUDET Facts



- **proposal submitted March 2005**
- **successfully passed evaluation**
- **invitation for negotiations with EU in July 2005**
- **final budget and project description agreed last week**

- **anticipated start 1.1.2006**
for a duration of 4 years

Budget:

- **21.5 million Euro total**
- **7.0 million Euro EU contribution**

Manpower:

- **≈ 57 FTE total**
- **≈ 17 FTE funded by EU**

EUDET Partner Institutes:



Charles University Prague
IPASCR Prague



HIP Helsinki



LPC Clermont-Ferrand
LPSC Grenoble
LPHNE Paris
Ecole Polytechnique Palaiseau
LAL Orsay
IReS Strasbourg
CEA Saclay



DESY
Bonn University
Freiburg University
Hamburg University
Mannheim University
MPI Munich
Rostock University



Tel Aviv University



INFN Ferrara
INFN Milan
INFN Pavia
INFN Rome



NIKHEF Amsterdam



AGH Cracow
INPPAS Cracow



CSIC Santander



Lund University



CERN Geneva
Geneva University



Bristol University
UCL London

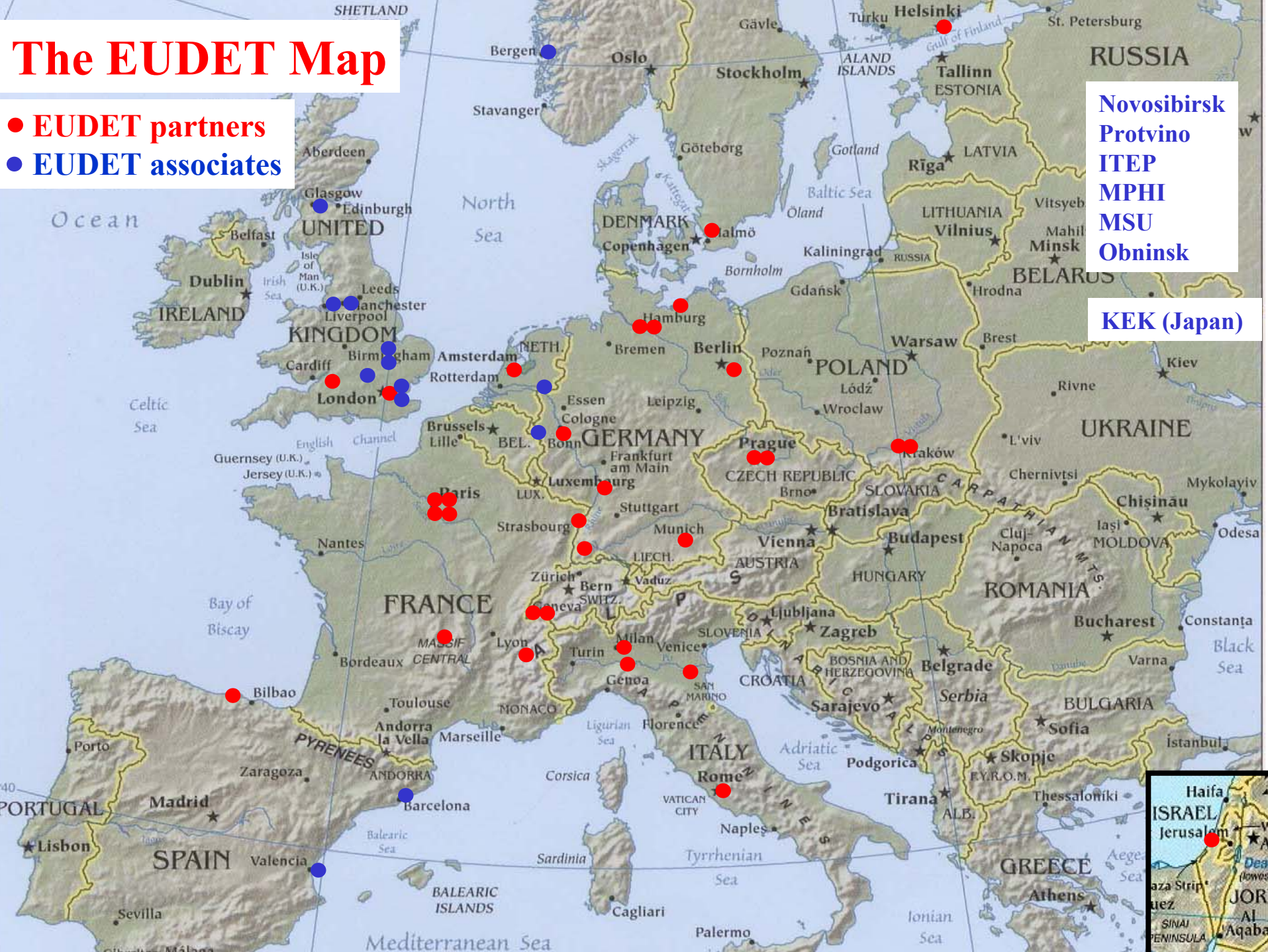
+ 20 associated institutes

The EUDET Map

- EUDET partners
- EUDET associates

- Novosibirsk
- Protvino
- ITEP
- MPHI
- MSU
- Obninsk

KEK (Japan)



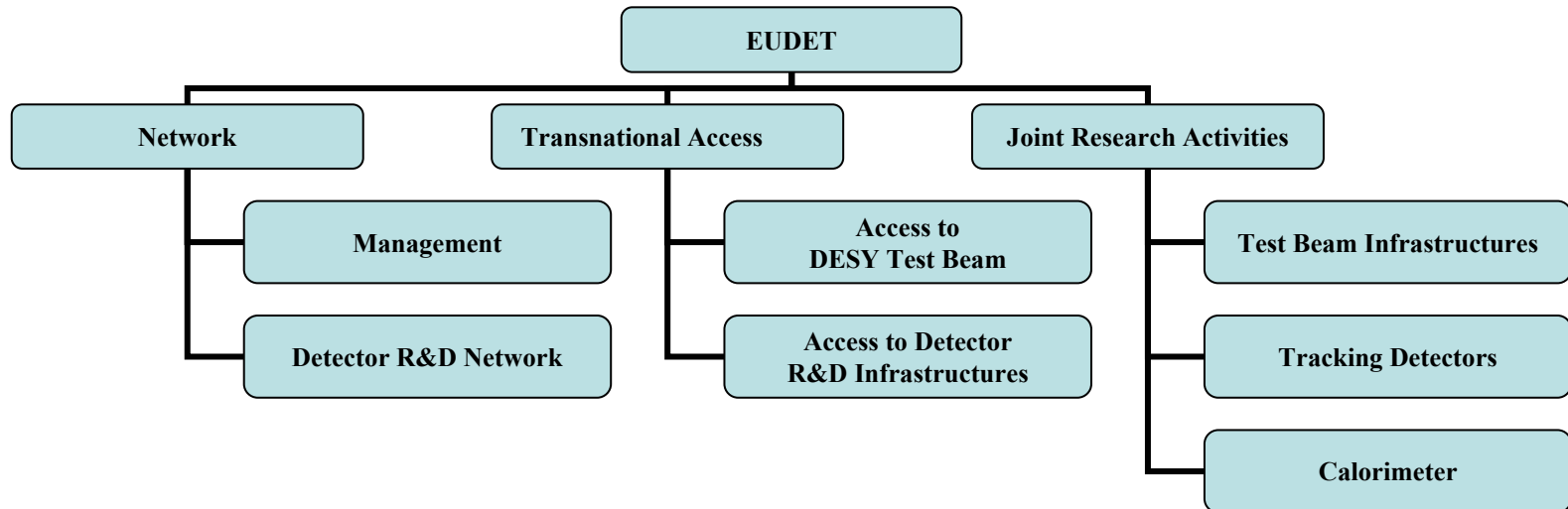
EUDET Structure



I3 projects based on three pillars (mandatory):

- **Networking Activities**
- **Transnational Access**
- **Joint Research Activities**

Structure of EUDET:



Joint Research Activities



JRA1: Testbeam Infrastructure

- **Large bore magnet:**
 - 1.5 Tesla, $\text{\O} \approx 85$ cm, stand-alone He cooling, supplied by KEK
 - infrastructure (control, field mapping, etc.) through EUDET

- **Pixel beam telescope**
 - 4 layers of MAPS detectors
 - CCD and DEPFET pixel detectors for validation
 - DAQ system

Note: all EUDET infrastructure is movable

- construction & initial tests at DESY
- later exploitation at CERN, FNAL etc. possible

Joint Research Activities



JRA2: Tracking Detectors

- **Large TPC prototype:**
 - low mass field cage (for JRA1 magnet)
 - modular endplate system for large surface GEM & μ Megas systems
 - development of prototype electronics for GEM & μ Megas

- **Silicon TPC readout:**
 - development MediPix \rightarrow TimePix
 - TPC diagnostic endplate module incl. DAQ

- **Silicon tracking:**
 - large & light mechanical structure for Si strip detectors
 - cooling & alignment system prototypes
 - multiplexed deep submicron FE electronics

Joint Research Activities



JRA3: Calorimeter

- **ECAL:**
 - scalable prototype with tungsten absorbers
 - Si-sensors & readout chips

- **HCAL:**
 - scalable prototype
 - multi-purpose calibration system for various light sensing devices

- **Very Forward Calorimeter:**
 - laser-based positioning system
 - calibration system for silicon and diamond sensors

- **FE Electronics and Data Acquisition System for the calorimeters**

Networking Activities



Very important part of the project!

- **Information exchange and intensified collaboration:**
 - web based information system
 - annual workshops
 - open for everyone!

- **Common simulation and analysis framework:**
 - development of common software framework (testbeam analysis & ILC simulation)
 - small grid based computer cluster

- **Validation of simulation:**
 - e.g. Geant4 shower simulation

- **Deep submicron radiation-tolerant electronics:**
 - access through CERN contracts

Transnational Access



- imposed by the EU to open trans-European access to research facilities
- not really necessary in High Energy Physics

However, we could take advantage of it:

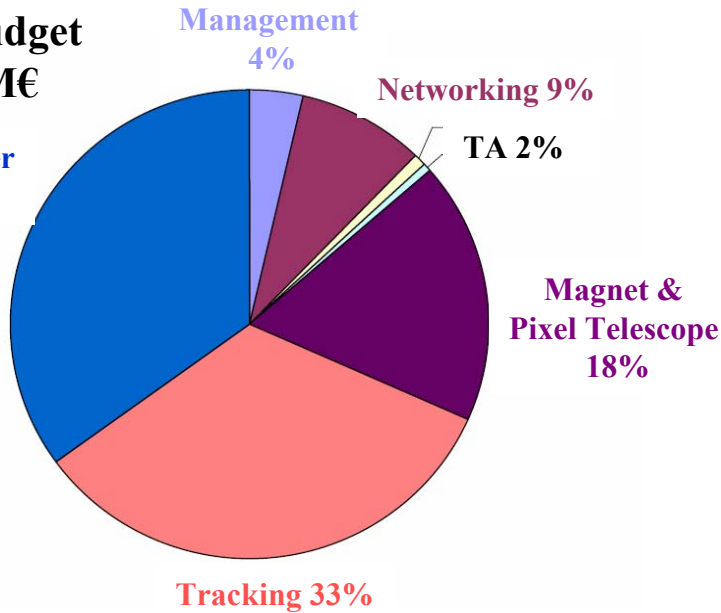
- **some travel support for European groups**
 - using the DESY testbeam (as of 2006)
 - using the EUDET infrastructures (as soon as available):
 - beam telescope
 - TPC
 - Si TPC
 - Si tracking
 - calorimeter
- **Please contact me for details**

EUDET Budget and Time Profile

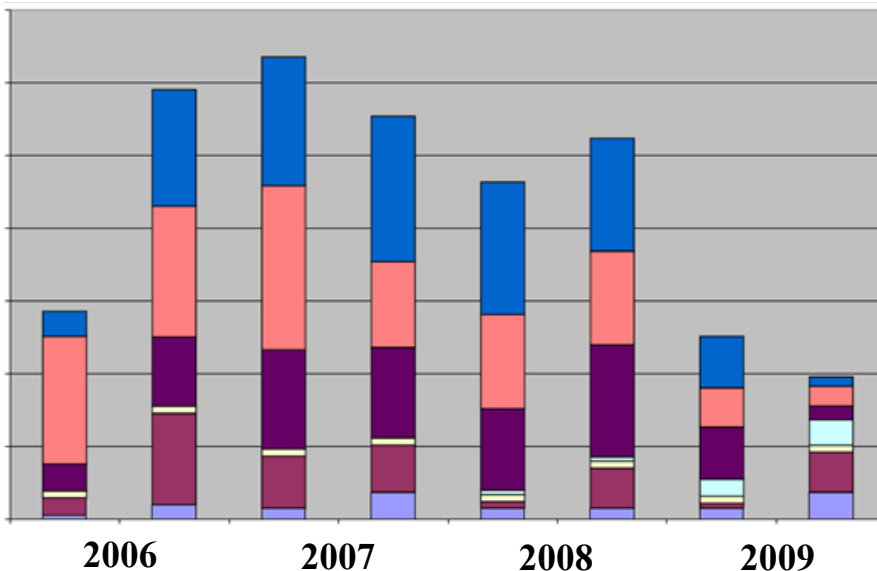


Total budget
21.5 M€

Calorimeter
33%

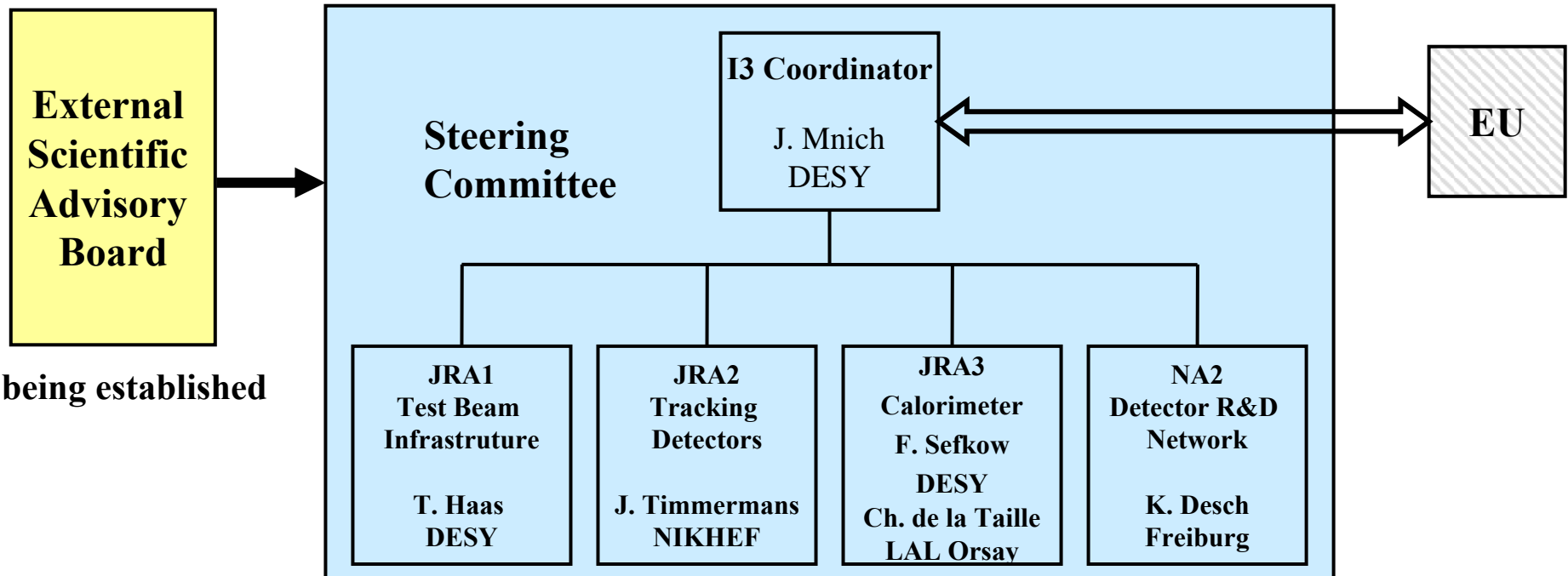


- most of the resources for the development of the infrastructures



- ramp-up first half 2006
- full swing activities for 2.5 years
- last year: phase-out and exploitation of infrastructures

EUDET Management



- task leaders are being assigned for the various work packages
- annual EUDET meetings and workshops

EUDET Status and Plans



- **negotiations with EU successfully concluded (almost) on track for project start January 1st, 2006**
- **informal brainstorming meetings started to discuss and define plans, technical issues etc.**
- **EUDET kick-off meeting February 15th - 17th at DESY**
- **EUDET web page under development**

www.eudet.org

more information soon

Conclusions



- **EUDET is latest example for the high recognition of ILC at the EU**
- **Provides additional funds for European institutes**
 - to help in the next phase of ILC detector R&D
- **even more important**
 - EUDET can help to raise additional funds at national agency
 - if successful, prepare future collaboration with the EU on the ILC detector
- **Additional funds are needed**
 - to create and exploit the infrastructures
 - everyone is invited to participate
- **EUDET is an ambitious programme with a lot of exciting work ahead of us**