

# NA2

## Brussels

### 30 March 2011

EUFORIA

# Scope

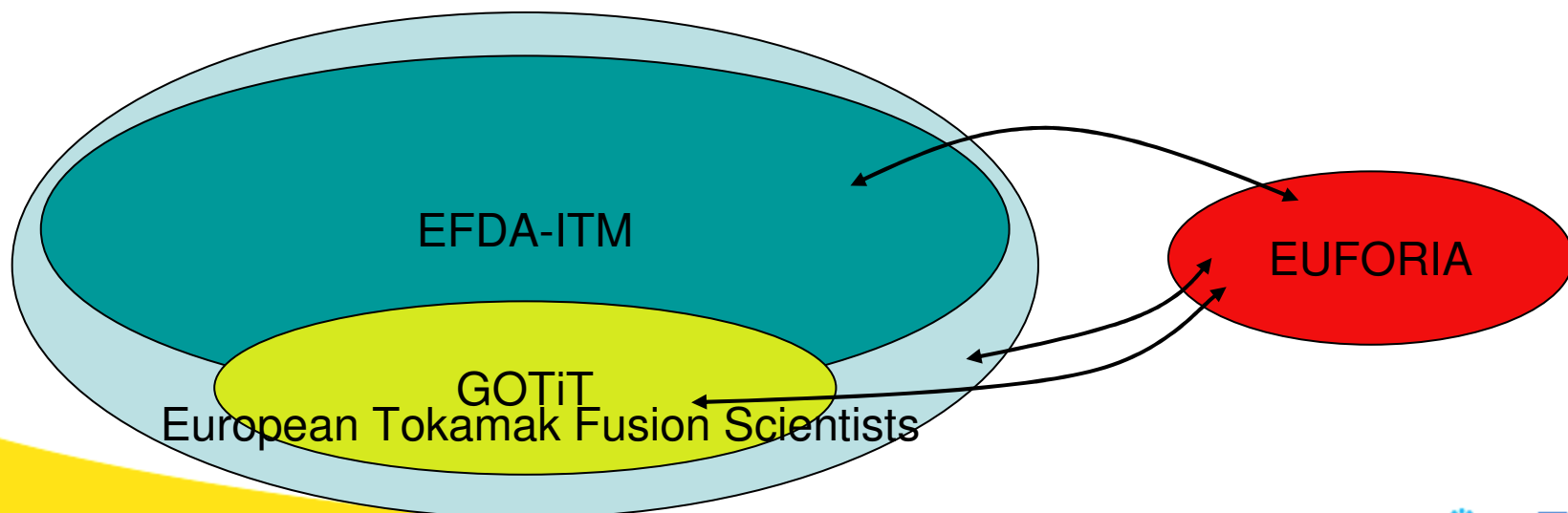
- Provide a comprehensive training programme, which will be designed to enable users to develop the required knowledge and skills to utilise the infrastructure.
- Develop and maintain a series of companion guides for EUFORIA users, on how to exploit the Grid and HPC infrastructures.
- Training courses
  - 3-5 days yearly
  - Shorter 1-2 day course, at least 2 yearly
  - Workshops, using videoconferencing
- Partners:
  - Lead Partner: UEDIN: 15 PM
  - Other Partners: CIEMAT: 10 PM

# Implementation

- Requirements capture
  - Develop training program for target user community(ies)
- Develop training program
  - Adapting existing material, developing new material
- Provide training
  - Focussed courses with target user community
  - Remote workshops

# Implementation

- Target community
  - European fusion scientists
    - Early career
    - Experienced
    - Project members/Simulation developers
- Well organised community



# 2010

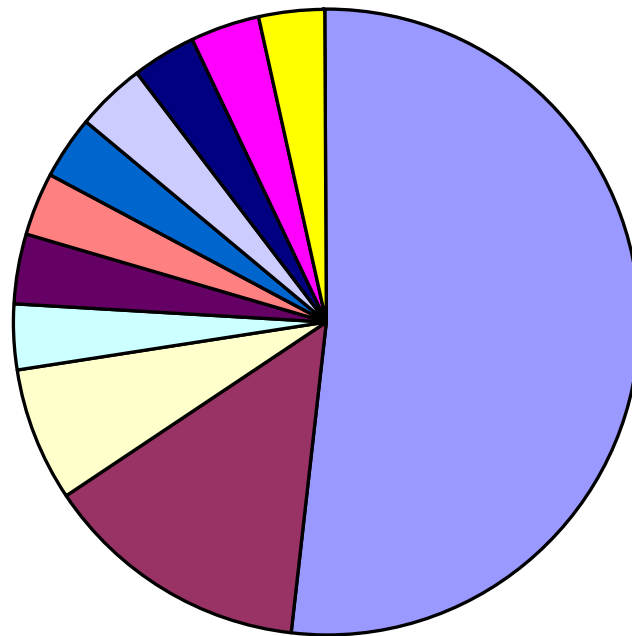
- 3 large courses:
  - GOTiT training course in Germany:
    - 5 ½ days training:
      - GPGPU Programming
      - Fortran 90
      - Tools and Optimisation for Programming
      - Advanced Shared Memory Programming
      - Advanced Message Passing Programming and I/O
      - Workflow Tools
    - 29 attendees
  - ITM general meeting in Portugal:
    - 2 ½ days training:
      - SVN Course
      - Introduction to MPI Course
      - MPI-I/O Course
      - GPGPU Introduction Course
      - GPGPU Advanced Course
    - 60 attendees

# 2010

- GPGPU course
  - 2 ½ days training in CIEMAT
  - 21 attendees
- 4 workshops:
  - Parallel Grid
  - Novel Architectures
  - HPC-I/O
  - Data Intensive
- Collaboration with GOTiT and HPC-Europa2 projects
- Birds-of-a-feather session at SC10
  - “High Performance Workflows”
  - Well attended (100+), high profile

# 2010

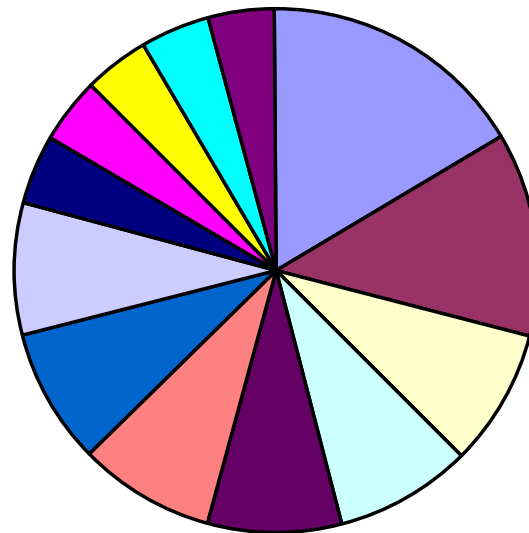
## GOTiT Course 2010



- Germany
- Netherlands
- Italy
- Slovenia
- Mexico
- Ireland
- Hungary
- France
- Finland
- Czech Republic
- Belgium

# 2009

## GOTiT Course 2009

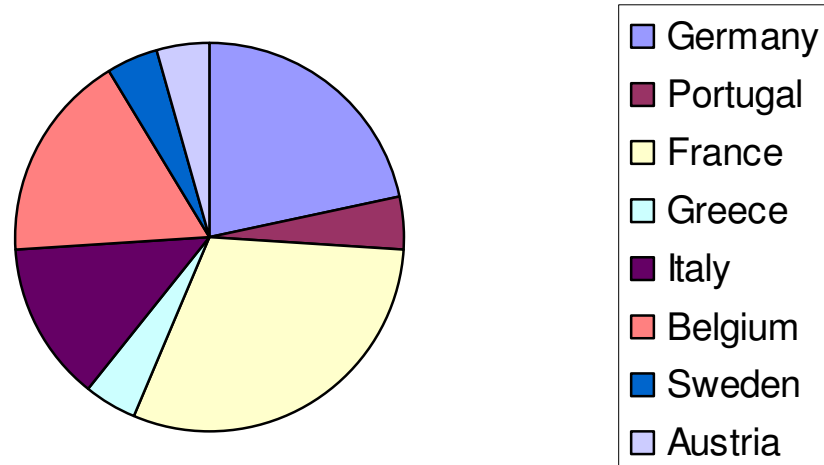


- Italy
- Belgium
- Germany
- Netherlands
- Sweden
- Finland
- Denmark
- United Kingdom
- Poland
- Greece
- USA

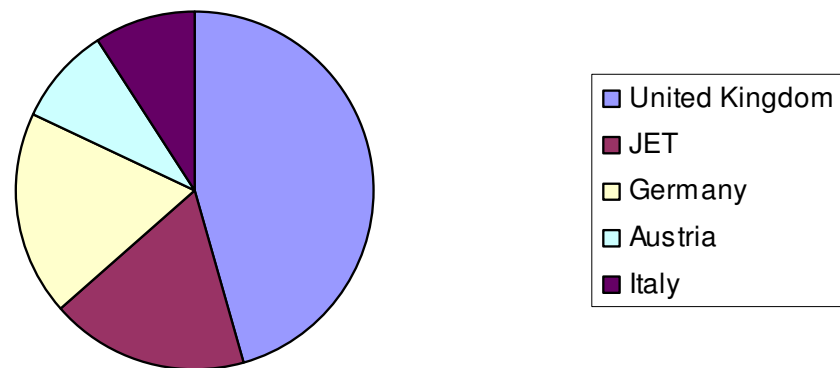


# 2008

## ITM Training 2008



## JET Training Course 2008

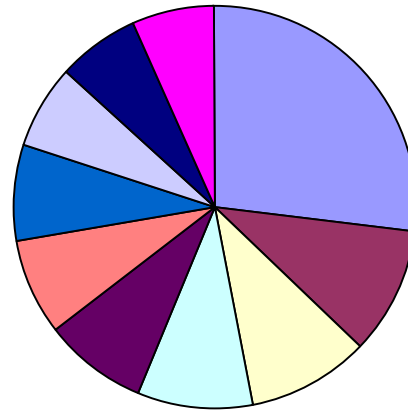


# Companion Guides

- Documentation for tools and infrastructure
  - Simplify use and provide support to users
  - Maintained and updated in 2010
  - **Gateway Companion Guide**
  - **Grid Companion Guide**
  - **Grid Compilation Companion**
  - **Parallel Grid Companion Guide**
  - **HPC-Grid Actor Companion Guide**
  - **Parallel Programming Companion Guide**
  - **Security4GridDevelopers Companion Guide**
  - **Security4GridUsersCompanion Guide**
  - **VisIt Companion Guide**

# Companion Guides

**Companion Guide Downloads**



- Grid
- Security of Grid Developers
- ITM Gateway
- Security for Grid Users
- Parallel Programming
- Grid Compilation
- VISIT
- Parallel Grid
- HPC Grid Actor
- Grid Quick Facts Sheet

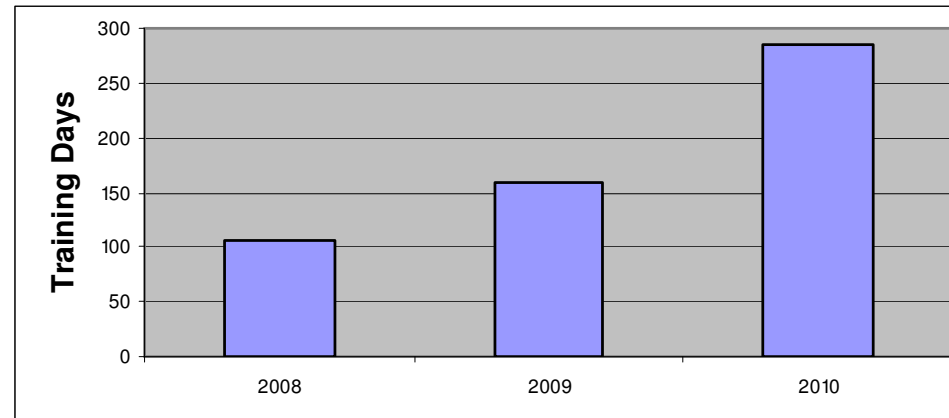
Grid	436
Security of Grid Developers	168
ITM Gateway	158
Security for Grid Users	149
Parallel Programming	134
Grid Compilation	128
VISIT	124
Parallel Grid	110
HPC Grid Actor	109
Grid Quick Facts Sheet	106

# Deliverables and Milestones

- PM 18: Delivered together on-time
  - DNA2.1: Training Material Development
  - MNA2.1: EUFORIA Training Program
- PM 24: Delivered together on-time
  - DNA2.2: Companion Guides
  - MNA2.2: EUFORIA Training Guides

# Impact

- Provided ~550 training days over 16 courses in 5 different countries
  - Collaborated with DEISA, GOTiT, HPC-Europa2, EFDA HLST, EFDA-ITM, and others
  - Established as the leading computational training provider for fusion in Europe
- International workshop
  - High performance Workflows



# Impact

Training Event	Number Days of	Number of Places Provided	Number Attendees of	Training Days Provided
Jet Modelling Meeting Training	1½	20	15	22½
ITM Meeting Training	4	40	20	80
HPC Infrastructure	¼	Unlimited	10	2½
Parallel FFT Workshop	¼	Unlimited	12	3
Genetic Algorithms Workshop	½	Unlimited	10	5
GOTiT Training	4	25	25	100
Kepler and Java API	½	20	6	3
UEDIN Courses	Various	5	0	0
Build Tools Workshop	¼	Unlimited	10	2½
ITM Meeting Training	3 x ½ day	40 per session	30 per session	45
Parallel Grid Workshop	¼	Unlimited	30	7½
Novel Architectures Workshop	¼	Unlimited	28	7
HPC-I/O Workshop	¼	Unlimited	20	5
Data Intensive Workshop	¼	Unlimited	12	3
ITM Meeting Training :	5 x ½ day	60	Various	50½
GOTiT Training	5½	35	29	159½
GPGPU Course	2½	25	21	52½
<b>Totals</b>				<b>548½</b>

# Impact and Future

- Wide range of training material developed
  - Best practices and Tools for Scientific Programming
  - Parallel/High Performance I/O
  - Basic software optimisation techniques
  - HPC Infrastructure
  - Introduction to New/Novel HPC Hardware (FPGAs, GPGPUs, and Cell Processors)
  - Data Intensive Computing
  - Using the EUFORIA Grid
  - Using the EUFORIA Grid for Parallel Programs
  - Parallel Fast Fourier Transforms
  - Genetic Algorithms for Fusion and the Grid
  - GPGPU Programming
  - Message Passing Programming: MPI
  - Shared Memory Programming: OpenMP
  - Autobuild and make tools
  - Revision control using SVN and the ITM Gforge system
- Material available online
  - EUFORIA web and indico site
  - Available beyond end of project

# Impact and Future

- Material re-used by others
  - Courses and training in local training programs and workshops/courses
- Training material has a limited lifetime
  - Core training provided by infrastructure projects
  - GOTiT and HLST take forward training challenge for fusion community