

Welcome to the workshop

**Optical Networks for Accurate Time
and Frequency Transfer**

20-21 November 2012,

Hoofddorp, The Netherlands

Network for European Accurate Time and Frequency Transfer

Harald Schnatz

Physikalisch-Technische Bundesanstalt, Braunschweig, Germany

on behalf the JRP Consortium

Workshop, Hoofddorp, 20-21 November 2012,

the European Metrology Research Programme

- The European Metrology Research Programme (EMRP) enables European metrology institutes, industrial organisations and academia to collaborate on joint research projects (JRP) within specified fields.
- These collaborative efforts will accelerate innovation in areas where shared resources and decision-making processes are desirable due to economic factors and the distribution of expertise across different countries and sectors.
- The EMRP is implemented by EURAMET, organised by 22 National Metrology Institutes (NMIs), supported by the European Union and has a value of 400 M €.

Why do we need fiber links?

EMRP

European Metrology Research Programme
■ Programme of EURAMET



The EMRP is jointly funded by the EMRP participating countries within EURAMET and the European Union

Satellite transfer techniques **do not reach** the performance required for modern clocks.

Modern clocks require fully optical, phase-coherent transfer methods.

Optical links are the **enabling technology** for time & frequency metrology and will become the standard transmission tool for comparisons and are mandatory for a redefinition of the SI-Second.

Scientific Objectives of NEAT-FT

EMRP

European Metrology Research Programme
■ Programme of EURAMET



The EMRP is jointly funded by the EMRP participating countries within EURAMET and the European Union

- **Develop the equipment necessary for reliable operation of fiber links**
- **Demonstrate all technological steps towards a full optical link infrastructure.**
- **Investigate new techniques for time transfer over optical fiber networks in order to provide better timing signals than currently available with GPS receivers.**

Technical Workpackages of the JRP

EMRP

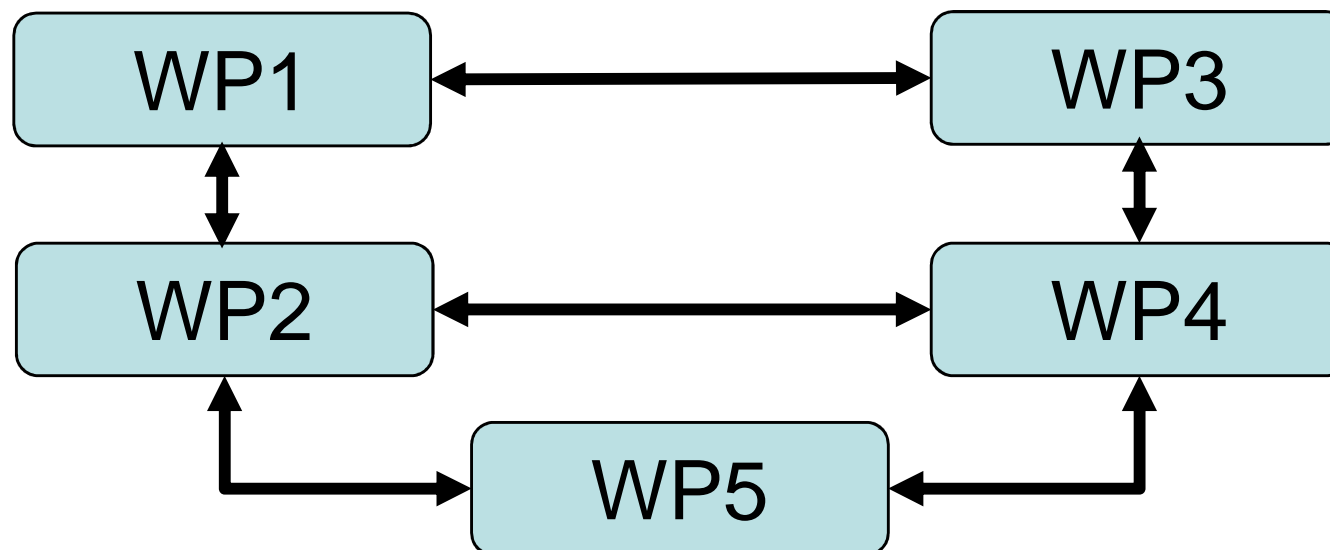
European Metrology Research Programme
■ Programme of EURAMET



The EMRP is jointly funded by the EMRP participating countries within EURAMET and the European Union

Extending frequency transfer capabilities

Extending time transfer capabilities



WP 1: Develop techniques for frequency comparisons at $\sim 10^{-18}$ at 1 day

WP 2: Demonstrate long distant fiber link capability

WP 3: Novel techniques for accurate time transfer over fiber

WP 4: Novel methods and protocols for distant time comparisons

WP 5: Investigate future applications of remote fiber links

JRP-Coordinator

PTB, Germany



Funded JRP-Participants

BEV, Austria



INRiM, Italy



MIKES, Finland



NPL, United Kingdom



OBSPARIS, France



SP, Sweden



UFE, Czech Republic



VSL, The Netherlands



Dutch
Metrology
Institute

Unfunded JRP-Participants

CESNET, Czech Republic





NMIs participating in JRP



All fiber links are operated in collaboration with NRENs



Project Website

http://www.ptb.de/emrp/neatft_home.html

Regular project meetings
with external participants



2 workshops
with stakeholders



H. Schuh

G. Santarelli

F.-L. Hong

C. Salomon

International Advisory Board



2 Researcher
Excellence Grants

AKADEMIA GÓRNICZO-HUTNICZA
IM. STANISŁAWA STASZICA
AGH W KRAKOWIE



Schedule

Tuesday, Nov. 20th	
12:00-13:00	Registration and Lunch
13:15-13:30	Welcome, H. Schnatz, PTB
13:30-14:15	Benefits of Modern Clocks Patrick Gill, National Physical Laboratory
14:15-15:00	Frequency Transfer via optical fibers Gesine Grosche, Physikalisch-Technische Bundesanstalt
15:00-15:30	Break
15:30-16:15	Time Transfer through optical fibers Anne Amy-Klein, Laboratoire de Physique des Lasers, Université Paris 13
16:15-17:00	Poster Session I
17:00-19:00	Free time / Social Time
19:00	Dinner

Wednesday, Nov. 21th	
08:30 - 9:00	ESA activities on fibre optic frequency dissemination E. Murphy, European Space Agency
9:00-9:30	The Importance of Time and Frequency in Geodesy Prof. K.U. Schreiber, Technische Universität München
9:30-10:00	White Rabbit Timing and Data network Dr. Erik van der Bij, CERN
10:00 - 10:30	break
10:30 - 10:50	SuperGPS through optical networks Dr. Jeroen Koelemeij, Vrije Universiteit Amsterdam
10:50 - 11:10	GEANT testbed connectivity Sandy Yatteau, DANTE
11:10 - 12:30	Poster session II
12:30 - 13:00	Closing
13:00 - 14:00	Lunch
14:00	Departure



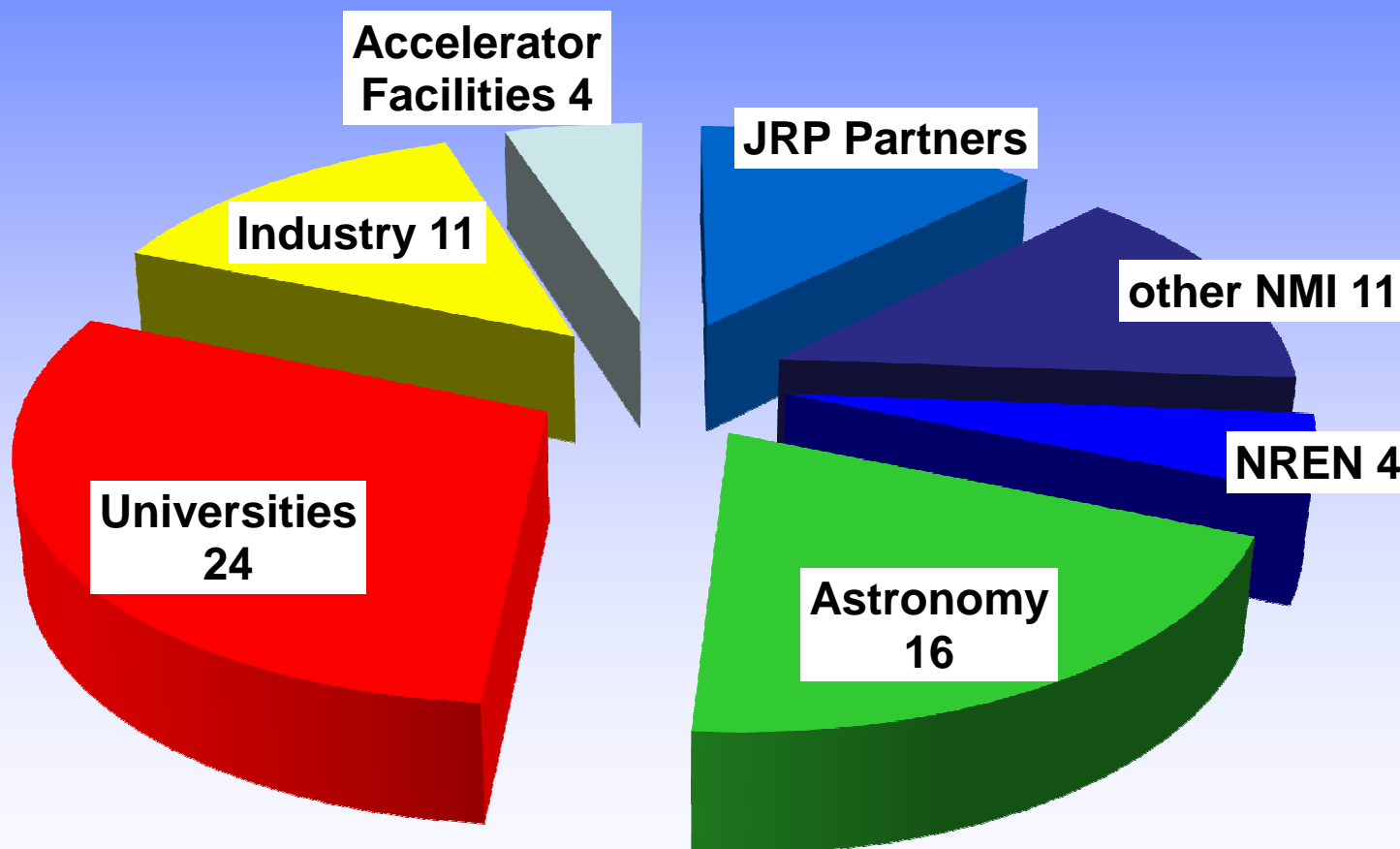
Homepage

http://www.ptb.de/emrp/neatft_home.html

Contact

bb-vsl@vsl.nl, Harald.Schnatz@PTB.de

70 external participants



Metrology meets Industry & Science

Workshop
Optical Networks for Accurate
Time and Frequency Transfer

20-21 November 2012,
Hoofddorp, The Netherlands

Why do YOU need fiber links?



EMRP

European Metrology Research Programme
► Programme of EURAMET

The EMRP is jointly funded by the EMRP participating countries within EURAMET and the European Union

