## WP5 – Knowledge management
### Achievements and milestones M7 - M12

Prof. Dr.-Ing. J. Lunze «Lunze@atp.ruhr-uni-bochum.de»

Dipl.-Ing. A. Schild «Schild@atp.ruhr-uni-bochum.de»

# WP5 overview

## Knowledge ⬇

- **Problems:**
  - Open problems
  - Project aims
  - Benchmarks
- **Solutions:**
  - Publications
  - Software
  - Experimental data
- **Lecture notes:**
  - Tutorials
  - Examples
- **Activities:**
  - Projects
  - Research

## Management ⬇

- **Location** and acquisition ← Annotated bibliography
- **Archiving**
  - Organisation of the knowledge domain ← Taxonomy, glossary
  - Appropriate Storage
- **Provision of access**
  - → Passive role ← Virtual library (**HILib**)
- **Dissemination**
  - → Active role ← On-line handbook
  - ← Summer school

HYCON
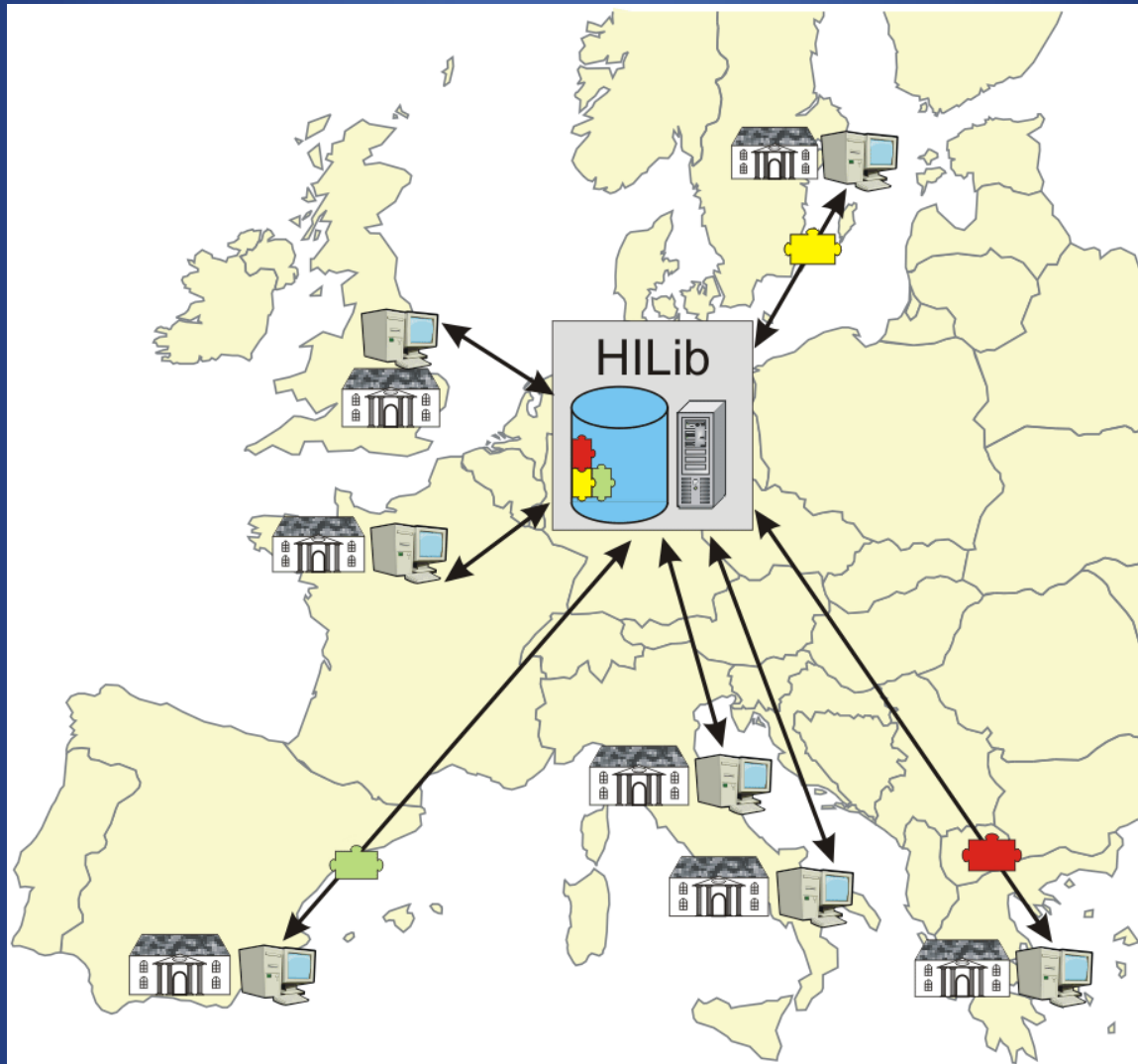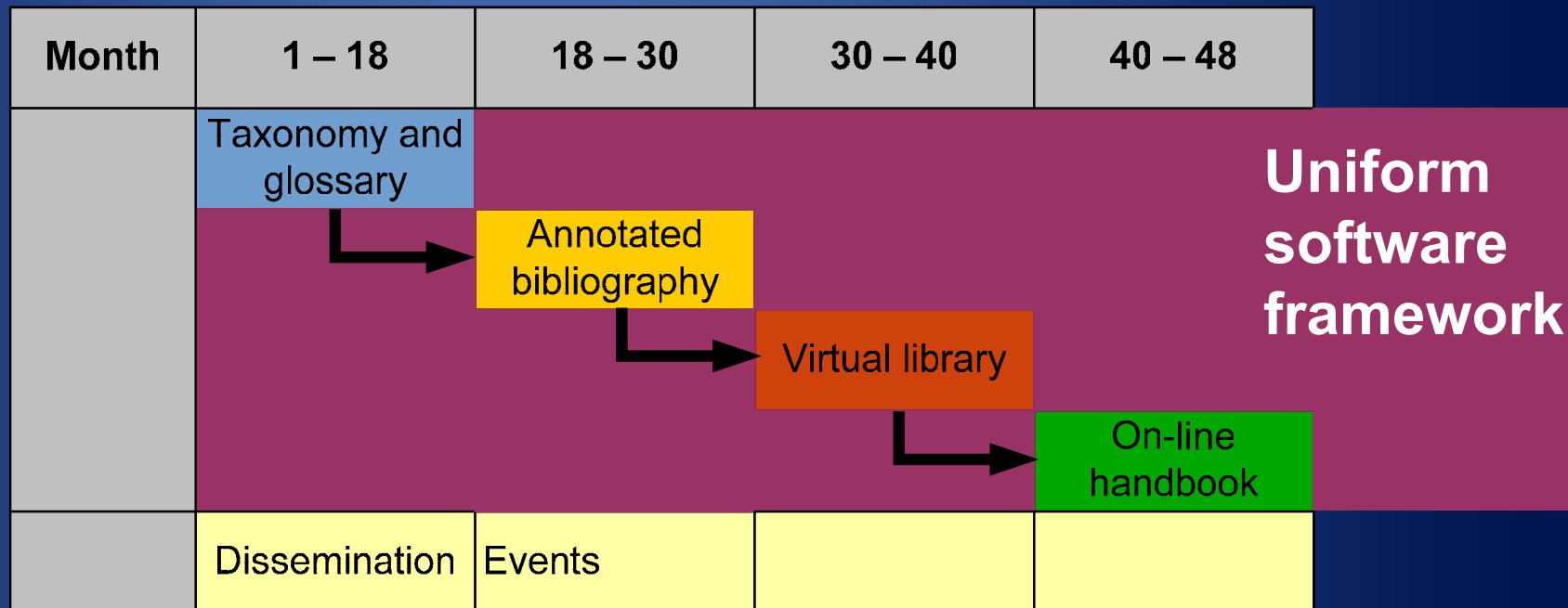
- **Integration activity:** Shared infrastructure across NoE

- **Decentralized submission** of documents by NoE nodes

- **Representation** of the NoE as a single entity

# WP5 overview

| Month | 1 – 18 | 18 – 30 | 30 – 40 | 40 – 48 |
|-------|--------|---------|---------|---------|
| | Taxonomy and glossary | Annotated bibliography | Virtual library | On-line handbook |
| | Dissemination | Events | | |

**Uniform software framework**

**Task 5.1**: Taxonomy and Glossary of hybrid systems
**Task 5.2**: Annotated bibliography
**Task 5.3**: Virtual Library of hybrid systems (HILIB)
**Task 5.4**: On-line handbook of hybrid systems theory
**Task 5.5**: Dissemination events

# WP5 activities

- **1st draft of Taxonomy of hybrid systems**
  - ➡ **Milestone 5.1.2:** Workshop for the discussion and extension of the first of the taxonomy and glossary (M10)

- **Setup of basic technical infrastructure of annotated bibliography**
  - ➡ **Milestone 5.2.1:** Creation of a working group for the creation of the annotated bibliography (M10)

  - ➡ **Milestone 5.2.2:** Workshop for the discussion of the annotated bibliography (M10)

- **Spreading of excellence** through
  - 2nd WP5 workshop, 18th July, Siena, Italy
  - 1st HYCON PhD. School, 19th - 22nd July, Siena, Italy

# WP5 activities

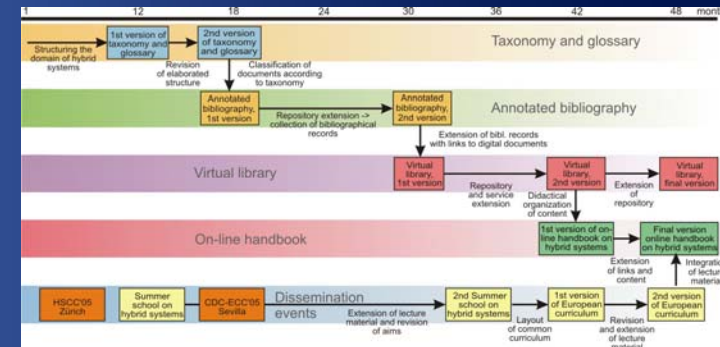- **Submission of documents** into repository

- **Adaptation of task structure**
  - **WP objectives remain unaltered!**
  - Schedule reflects activities of WP5 better



- Implementation of **reviewer recommendations**
  - WP5 homepage re-implementation
    � "Identity to build"
  - **Integration** with WP4c
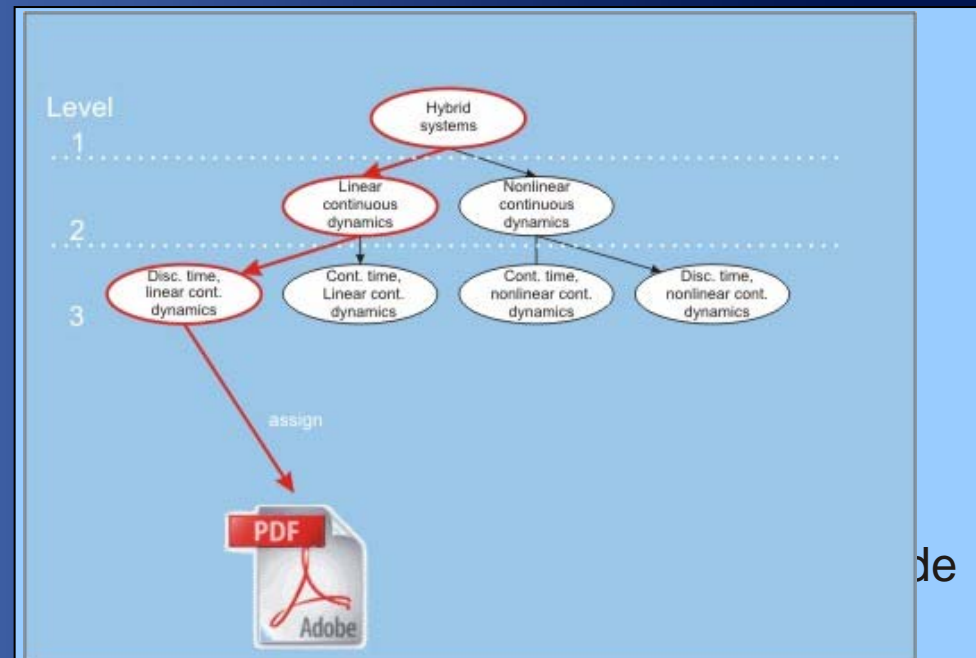


**Progression as planned!**

**Metadata** essential for efficient documents retrieval

- Browsing documents by subject
- Query formulation and refinement
- Measure for document distance

Different classification approaches possible

1. Hierarchical classification (Enumerative approach)
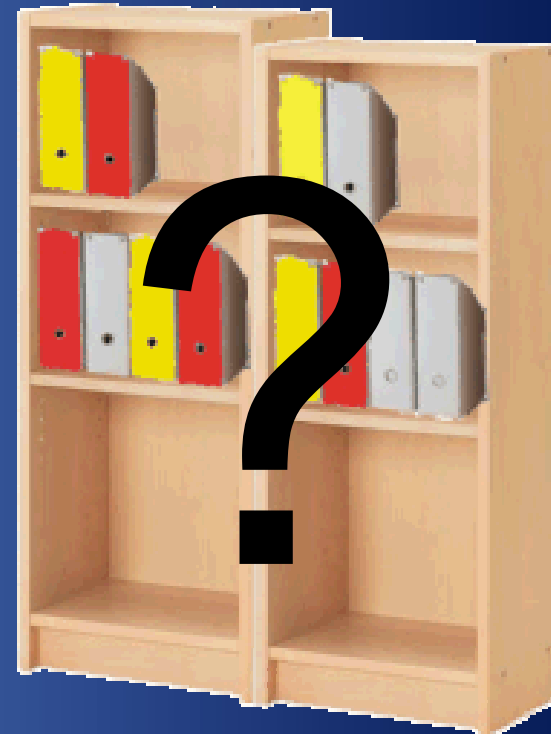
- Not practical
- One-dimensional order



de

## Problem of one-dimensional order



Models  Controller  Stability
Design  Analysis

Switched  Nonlinear
Systems  Systems

## 2. Facetted classification
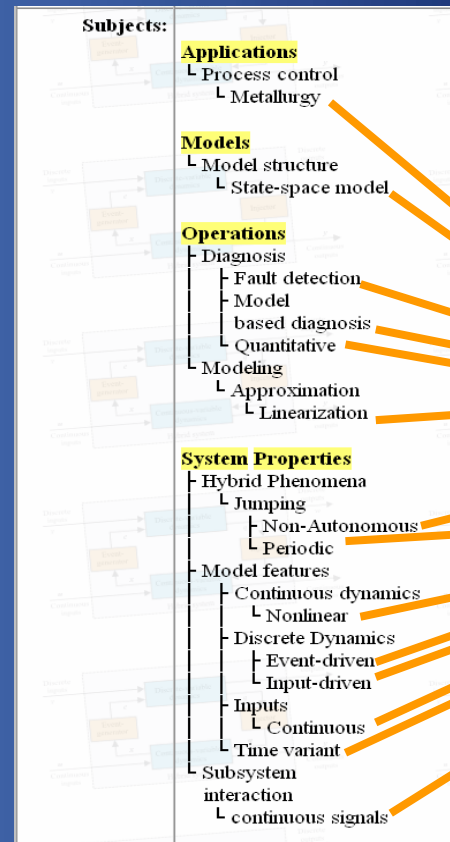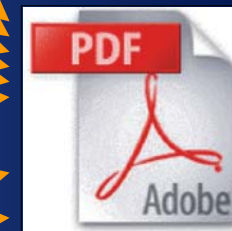
- "Structured tree of keywords"
- Intuitive usage
- Multi-dimensional order

→ More information included compared to title alone!

→ Higher precision in document retrieval



**Subjects:**

**Applications**
└ Process control
  └ Metallurgy

**Models**
└ Model structure
  └ State-space model

**Operations**
├ Diagnosis
│ ├ Fault detection
│ ├ Model based diagnosis
│ └ Quantitative
└ Modeling
  └ Approximation
    └ Linearization

**System Properties**
├ Hybrid Phenomena
│ └ Jumping
│   ├ Non-Autonomous
│   └ Periodic
├ Model features
│ ├ Continuous dynamics
│ │ └ Nonlinear
│ ├ Discrete Dynamics
│ │ ├ Event-driven
│ │ └ Input-driven
│ ├ Inputs
│ │ └ Continuous
│ └ Time variant
└ Subsystem interaction
  └ continuous signals

„A **cold rolling mill model** for **unwinding diagnosis**"

## Implementation concept
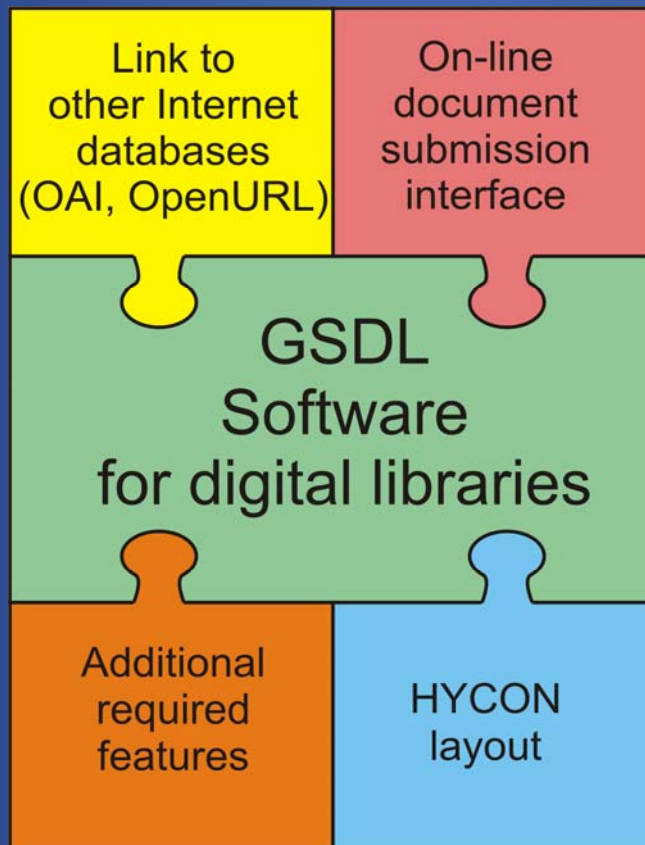


**Criteria:**

- Open source software and acceptable maintenance effort

- Allows integration of multi-media documents

- Long-term support ensured

- Implements OAI-interface
  ➝ link to other databases

# WP5 – Milestone 5.2.1 + .2 – Annotated Bibliography

Preliminary user interface of annotated bibliography



**Extension** of functionality requires core group of **dedicated partners!**

# Infrastructure concept of virtual library
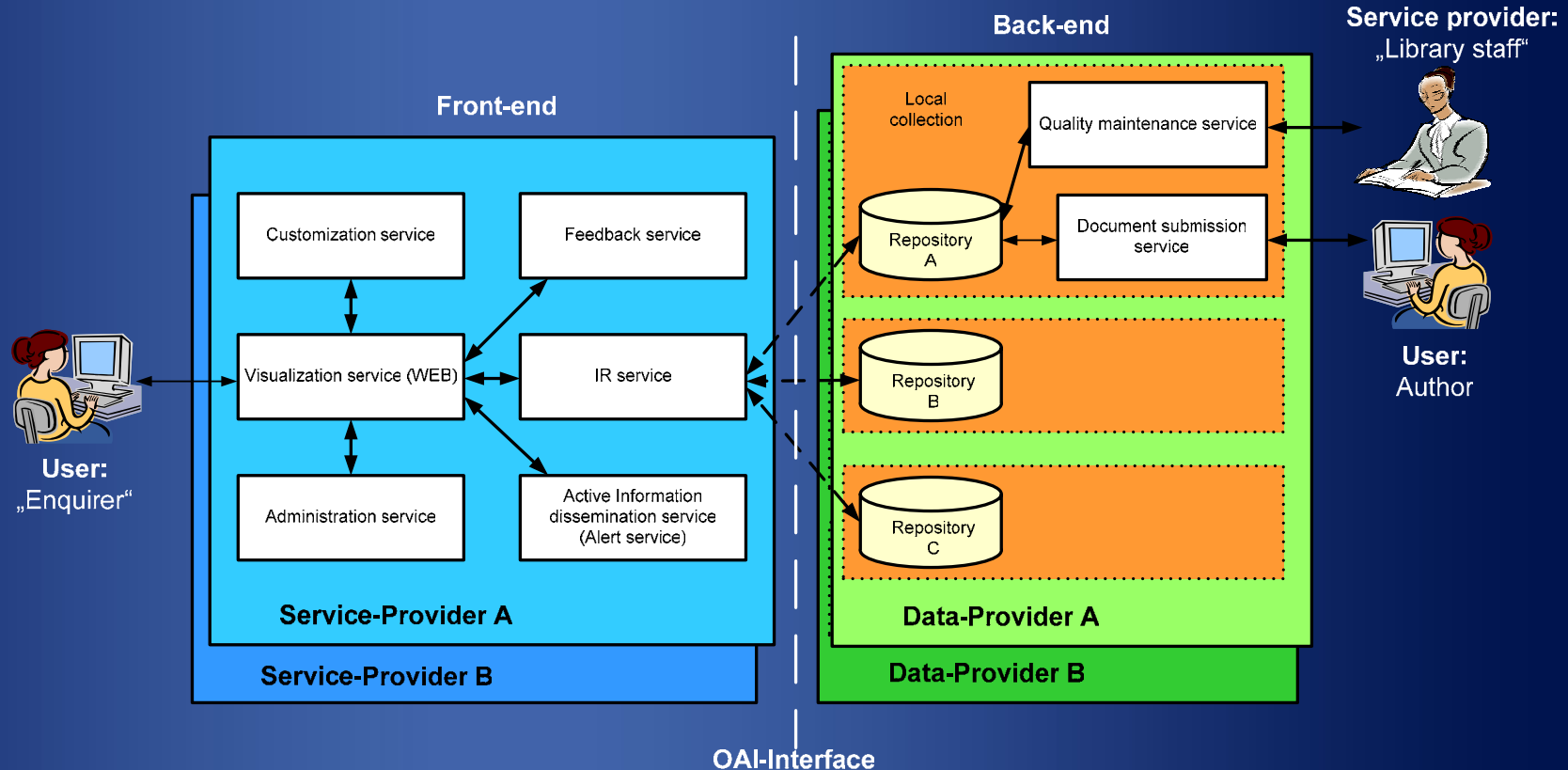
# WP5 – Milestone 5.3.3 – 1st HYCON PhD. School

- Location: University of Siena, Italy

- Duration: 4 days ➞ **15 Lectures**
    - ➞ Didactic structure
    - ➞ Broad overview of problems and existing methods

- **157 attendants** from across Europe

- **Extremely positive feedback!**

- Lecture material will be made accessible on-line until December 2005 (D5.3.4)

# WP5 – Milestones and Deliverables M7- M12

**Task 5.1: On-line handbook on hybrid systems**
**Task 5.2: Virtual library**
**Task 5.3: European curriculum on hybrid systems**

| Milestones | | | |
|---|---|---|---|
| M5.1.2 | Workshop for the discussion and extension of the first of the taxonomy and glossary | Sept 2005 | ✓ |
| M5.2.1 | Creation of a working group for the creation of the annotated bibliography | Sept 2005 | ✓ |
| M5.3.2 | Definition of the aim and scope of a HYCON summer school | Sept 2005 | ✓ |
| M5.2.2 | Workshop for the discussion of the annotated bibliography | Dec 2005 | ✓ |

## Progression as planned!

**Remark:** in the next period the revised task structure will be used for WP5 ➡ different task names and numbers but same objectives!

# WP5 Identity – Opportunities for integration

WP 1:
EIHS

WP 2:
Bench-
marking

WP 3:
Tool
integration

WP 6:
Industrial
Bridging

WP 5:
Knowledge
management

WP 4a:
Energy-
management

WP 4d:
Networked
Control

WP 4c:
Automotive
Control

WP 4b:
Industrial
Controls
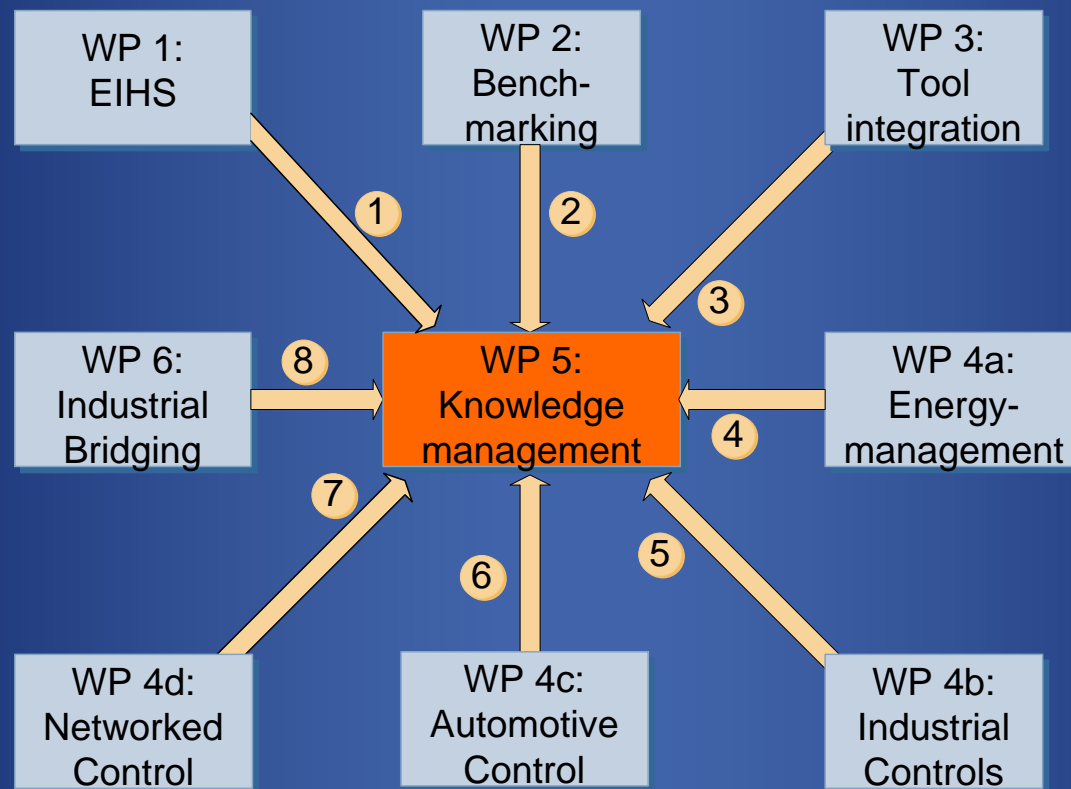
1 - Marketing of Network results through infrastructure

2 - Documentation of Benchmark problems
- Archiving experimental Data
- Documentation of „best practice" approaches

3 - HYCON tool repository, demonstarter site
- Classification and description of existing tools

4 - Listing of ongoing projects and their description
- Results of application of methods on case studies

5 - Documentation of case studies

6 - Modeling- and Controller design guidelines in the automotive industry

8 - Lecture materials of seminar programme

7 - Identification of open problems in the domain of networked control

| Effort consumption - M1 → M12 | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | | | |
| | FIST | CNRS | UCL | ETHZ | RUB | UNID | DLR | UMD | US | SUP | INRIA | UPAT | UAQ | UNIPI | UNISI | PARA | TUE | UT | TUD | KTH | ULIN | LTH | UCAM | | | |
| WP5 | | 1,5 | 0,5 | | 11,5 | 0,5 | | | 0,5 | | 1 | 0,5 | 0 | 1 | 1,5 | | 0 | 0,5 | | 1 | | | | | | 20 |
| | | 0,5 | 0,5 | | 6 | 4,5 | | | 2 | 0,75 | 0 | 0,25 | 0,5 | 2 | 1,5 | | | 0,5 | | 1 | | | | | | 20 |

## Large number of unfunded MMs due to

– Scattered funded resources among partners!

– Late arrival of funds from the EU (Feb. 2005)

# WP5 planned activities  M13-M30

- Extension/revision of taxonomy
- Extension of **annotated bibliography**
- **Finish concept** of virtual library
- **Intensify the integration** with other WPs

| Month | 1 – 18 | 18 – 30 | 30 – 40 | 40 – 48 |
|---|---|---|---|---|
| | Taxonomy and glossary | | | |
| | | Annotated bibliography | | |
| | | | Virtual library | |
| | | | | On-line handbook |

# WP5 – Documentation of progress M7 – M12

- Milestone and deliverable reports (HYCON homepage)

- PPR1 (Apr., 2005)

- WP5 homepage
  - → http://foellinger.atp.ruhr-uni-bochum.de/HomeWP5

- Minutes of 2nd WP5 workshop (July, 2005)

- PPR2 (Oct., 2005)

# WP5 – Work package schedule
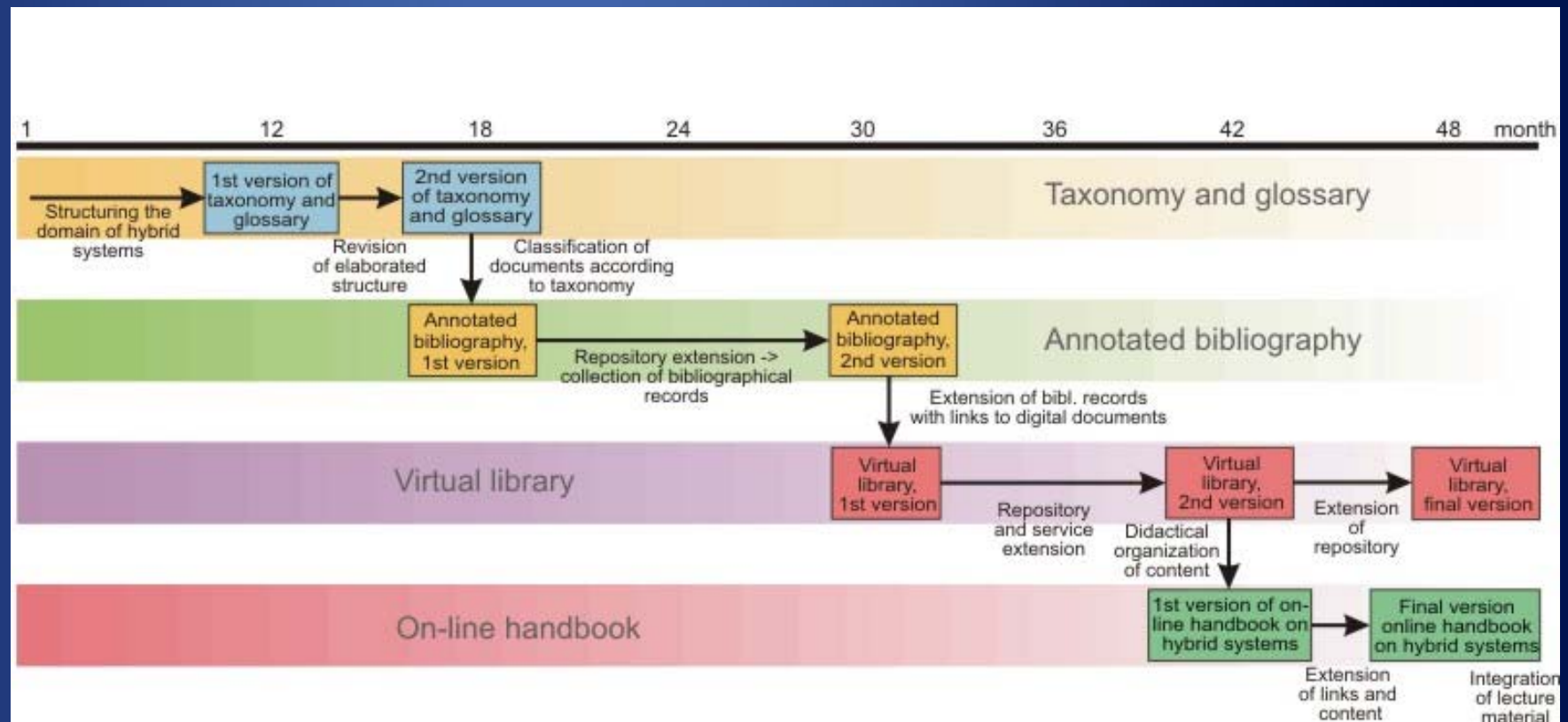
# WP5 – planned Milestones and Deliverables M13-M30

## Task 5.1: Taxonomy and glossary of hybrid systems

| Deliverables | | |
|---|---|---|
| D5.1.3 | Taxonomy and glossary available on the WEB for the NoE (**RUB, UT, UP**) ➡ **3,5 MM** | Mar 2006 |

## Task 5.2: Annotated bibliography

| Milestones | | | |
|---|---|---|---|
| M5.2.2 | Workshop for the discussion of the annotated bibliography (**RUB**) | Dec 2005 | ✓ |
| M5.2.3 | Call for submission of bibliographical items (**RUB**) | Dec 2005 | |
| **M5.2.5** | Workshop for the discussion of possible extensions to the annotated bibliography and about the procedure for its promotion (**UT**) ➡ **0,5 MM** | Jul 2006 | |
| **M5.2.7** | Survey of requirements regarding additional functionality of the annotated bibliography from the perspective of other HYCON WPs (**UNIDO, SUPELEC**) ➡ **2 MM** | Oct 2006 | |

## Task 5.2: Annotated bibliography

| Milestones | | |
|---|---|---|
| **M5.2.8** | On-line interface which links the taxonomy to the metadata generator and the annotated bibliography is available (**US, UVA**) ➡ **2,5 MM** | Nov 2006 |
| **M5.2.9** | Elaboration of a work-flow process for a decentralized repository administration of the annotated bibliography (**UNIDO, CNRS**) ➡ **2 MM** | Dec 2006 |
| **M5.2.10** | Increased number of users of the annotated bibliography among researchers of the NoE (**RUB, UNISI, UCL, CNRS, UT**) ➡ **3 MM** | Jan 2007 |
| **Deliverables** | | |
| D5.2.4 | Annotated bibliography available on the WEB (**RUB**) ➡ **1 MM** | Mar 2006 |
| **D5.2.6** | Metadata generation tool (HYDRA) for authors (**RUB**) ➡ **4 MM** | Oct 2006 |
| **D5.2.11** | Revised annotated bibliography (2nd version) (**RUB**) ➡ **2 MM** | Mar 2007 |

# WP5 – planned Milestones and Deliverables M13-M30

## Task 5.3: Virtual library

| Milestones | | |
|---|---|---|
| **M5.3.1** | Final definition and discussion of the repository structure and the basic services offered by the virtual library (**UAQ, TUE**) ➡ **3 MM** | Dec 2006 |
| **M5.3.2** | Workshop for the discussion of the concept of the virtual library (**CNRS**) ➡ **0,5 MM** | Jan 2007 |

## Task 5.5: Dissemination activities

| Milestones | | | |
|---|---|---|---|
| M5.5.3 | Call for participation at the special session at ECC-CDC (**US**) | Oct 2005 | |
| M5.5.6 | 1st HYCON summer school on hybrid systems | Dec 2005 | ✓ |
| M5.5.4 | Call for participation at the special session at HSCC | Jan 2006 | ✓ |

# WP5 – planned Milestones and Deliverables M13-M30

## Task 5.5: Dissemination activities

| Deliverables | | | |
|---|---|---|---|
| D5.5.5 | Lecture material of the summer school (**UNISI, RUB**) | Dec 2005 | |
| D5.5.7 | Proceedings of the special session on hybrid systems at ECC-CDC (**US**) | Mar 2006 | |
| D5.5.8 | Proceedings of the special session at HSCC | Mar 2006 | ✓ |

# WP5 - Budget plan M13-M30

**Planned effort -  M13 → M30**

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | FIST | CNRS | UCL | ETHZ | RUB | UNID | DLR | UMD | US | SUP | INRIA | UPAT | UAQ | UNIPI | UNISI | PARA | TUE | UT | TUD | KTH | ULIN | LTH | UCAM | RWTH | UVA | CNR | |
| WP1 | | 2 | 0,5 | | 10,5 | 2 | | | 1 | 1 | | 0,5 | 1 | 0 | 0,5 | | | 2 | 2,5 | | | | | | 1,5 | | **25** |
| | | 1 | 1 | | 8 | 1 | | | 1 | 1 | | 1 | 1 | 1 | 1 | | | 1 | 2 | | | | | | 1,5 | | **21,5** |

- Low number of funded MMs available
  - → reduced number of partners compared to previous period
- High unfunded effort input anticipated for all partners in the next period

HYCON