



# New Proposals in Reliability Engineering from the Patent-DfMMM NoE

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*Workshop on  
„Design for Reliability and Manufacturability in MNT“  
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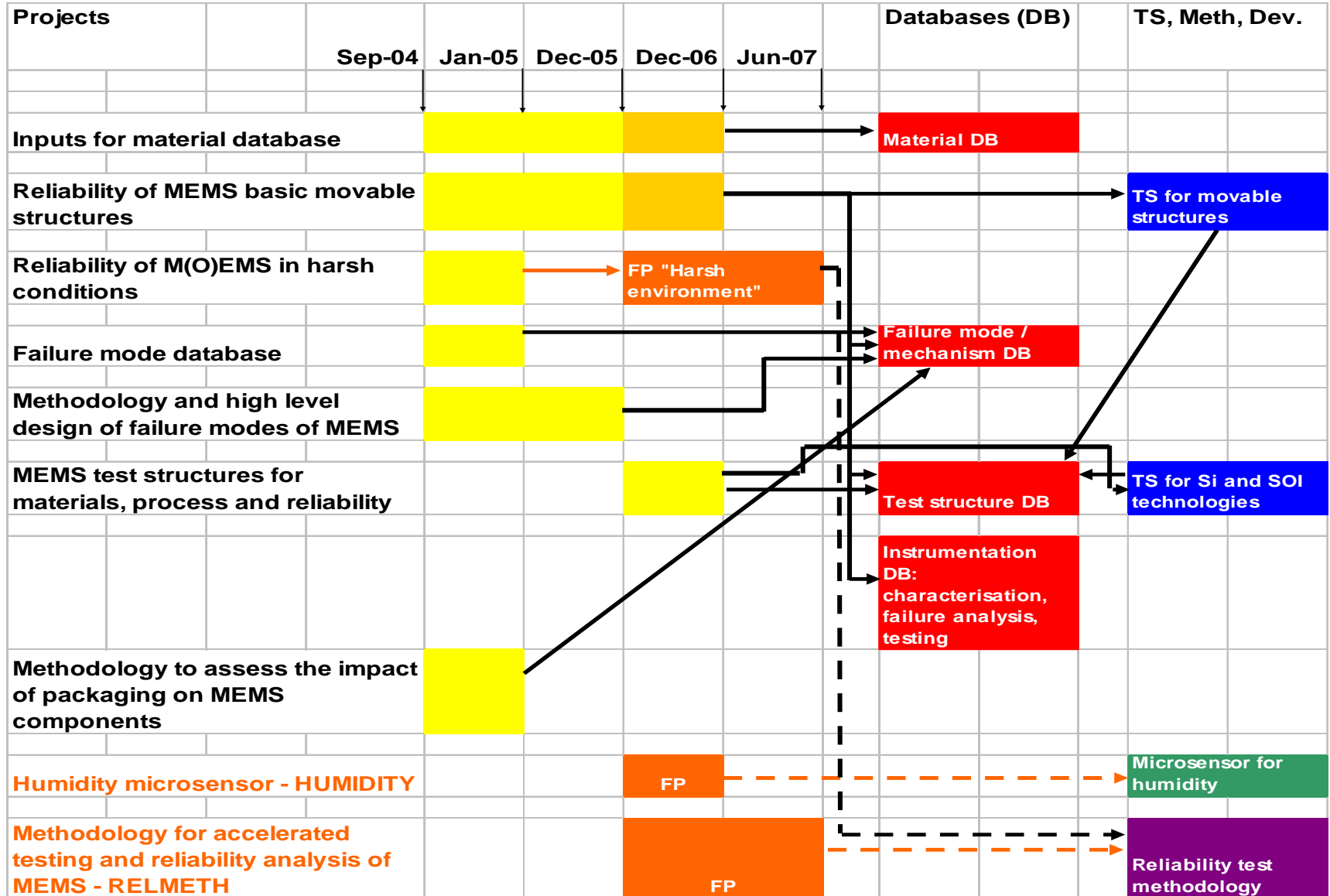
«Design for Micro & Nano Manufacture (NoE PATENT-DfMMM)»

Network of Excellence funded by the European Commission (EC FP6: IST, Unit C2, Contract 507255)

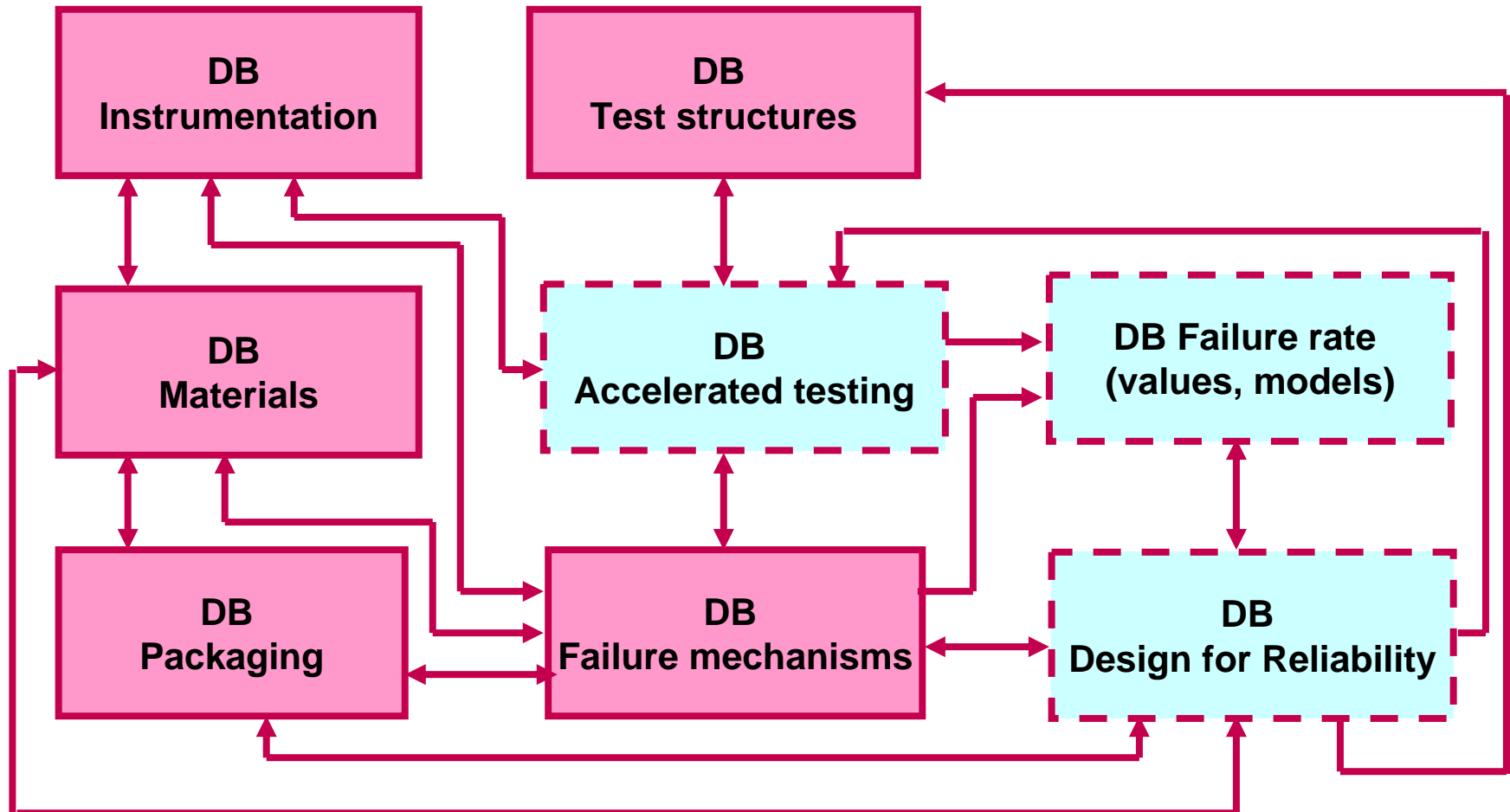
- Reliability Cluster of "Patent-DfMM"
- Service Cluster "EUMIREL"
- Training Network on Reliability

- "Patent-DfMM" NoE: 23 participants from 11 European countries
- 4 Technical WPs: Testing, Modelling & Simulation, Reliability & Characterisation, Packaging
- WP "Reliability & Characterisation": 17 participants
- Results: Databases, Test structures, Methodologies, Flagship Project RELIABILITY, Service cluster EUMIREL, etc.





## Patent-DfMM Databases



- Reliability Cluster of "Patent-DfMM"
- Service Cluster "EUMIREL"
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To give European industry and research centers:

- **Consultancy** (Physics of Failure, Test structures, FMEA studies, Modelling, Reliability test methodology)
- **Training** (courses open for all, customised to industry, etc.)
- **Information** (A regularly updated website and/or DVD and/or brochure with European centers that have know-how on reliability testing of microsystems and that are clustered within Eumirel)
- **Service** (Modelling, Failure analysis and Reliability testing)

... in microsystem reliability related fields.

## Industrial partners involved and their role

- In this phase, the industrial partners are seen as customers of Eumirel (in the future, maybe – partners)
- Industry can contact either one of the partners of this cluster directly, or they can contact the board or Patent that will redirect the industry to one or more of the best suited partners (although industry should be able to find the best partner they need using the document + DVD)
- A "one-stop-shop .....with many possible entrances"
- There will be a gentlemen's agreement between the Eumirel partners that whenever they get a request from industry (within or outside Eumirel) which they cannot answer, they should preferably redirect industry to one of the Eumirel partners.

## Animated timeline (from 2006 to 2012)

- ❑ **December 2006:** Service Cluster (EUMIREL - European Microsystems Reliability Service Cluster) is initiated by a steering board (IMEC, IMT, POLIMI, IMS), based on Flagship Project RELIABILITY (projects VIBSHOCT and RELMETH).
- ❑ **March-May 2007:** The steering board is gathering information about all possible partners and elaborates the working plan
- ❑ **June 2007:** The Partnership Agreement is signed by all partners
- ❑ **September 2007:** Set-up of the Service Portfolio and Business Plan for 2008-2012
- ❑ **October 2-4, 2007, Lancaster:** EUMIREL launching
- ❑ **January 2008:** First Assembly Meeting of EUMIREL
- ❑ **2008-2010:** EUMIREL acts as a "one-stop-shop" for Reliability Analyses of MEMS, funded by a FP7 project
- ❑ **2011-2012:** EUMIREL is a self-sustained institution or part of an European Institute on Reliability & Testing of Micro and Nano Technologies

## STRENGTHS

- A team of experienced working groups, trained to work together (NoE Patent-DfMM)
- Database with instruments inside the NoE
- Obtained results in the field (VIBSHOCKT, RELMETH)

## WEAKNESSES

- Partners with various degree of involvement in EUMIREL activity
- So far, lack of promptness of many partners

## OPPORTUNITIES

- The 7th Framework Programme of EC (proposed training network, other future proposals)
- The subject (MEMS reliability) is "hot" for MEMS industry (see MIG Annual Reports)

## THREATS

- Is EUMIREL self-sustainable without EC funding?
- Today, the industry confidence in EUMIREL possibilities is low

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## *FP7 PEOPLE Work Programme: Activity 1 – Initial Training of Researchers*

*Call Identifier: FP7-PEOPLE-2007-1-1-ITN*

*Deadline: May 7, 2007*

### Proposal: **Training Network on MEMS Reliability – MERIT**

- Purpose: To recruit research fellows and provide them with opportunities to undertake research on reliability and test of MEMS in the context of a **joint research training programme**
- Participants (Research): IMEC - Belgium, IMT – Romania, POLIMI – Italy, BUTE – Hungary, Fr. IMS – Germany, WUT – Poland, Technical Univ. Athens – Greece, UC Louvain – Belgium + **Industry**
- The participants...
  - ... recruit and employ / host eligible researchers
  - ... provide specialised training modules
  - ... participate in other dedicated network activities

- Duration: 4 years
- Industry participation:
  - Essential part of ITN
  - Full network partner, provider of research training and recruiting the eligible researchers, members of the supervisory board
  - Participants from Industry: Honeywell - Romania, Novamems (France), Philips Apptech (the Netherlands)
- Eligible researchers:
  - Early-stage researchers (in the first four years of their research careers) – predominant ones!
  - Experienced researchers:
    - Within their first five years of their careers
    - "Visiting Scientists" (a limited number...)

- Typical activities:
  - Training-through-research
  - Training courses
  - Networking activities: workshops, summer schools, visits, etc.
  - Complementary training (project management, language courses, etc.)
  - International conferences, etc.
  
- Training courses (examples):
  - *Accelerated Life Testing of MEMS*
  - *Reliability testing of MEMS*
  - *Techniques for MEMS functional testing*
  - *Embedded testing of MEMS*
  - *Failure analysis of MEMS and MEMS packages*
  - *Failure mechanisms in MEMS, FMEA*
  - *Quality & Reliability Assurance of MEMS*

- The Reliability Cluster of the NoE "Patent-DfMM" (FP6/IST project 2004-2007) intends to promote several FP7 proposals:
  - One proposal– A Training Network on Reliability
    - *FP7-PEOPLE-2007-1-1-ITN* (May 7, 2007);
  - Other possible proposals for Call 2, launched by the Service Cluster EUMIREL
    - *FP7-ICT-2007-2 Objective 3.6: Micro/nanosystems* (October 2007)