

# REVIEW REPORT ON RESEARCH LINE – TRANSPORTS OF LAETA

by Prof. Werner Schiehlen, University of Stuttgart, Germany

## Foreword

The undersigned, Professor Werner Schiehlen, visited IST during the period 7 – 10 September 2009 acting as reviewer of the Research Line – TRANSPORTS of LAETA.

The activities of Research Line – TRANSPORTS were presented by Profs. Manuel Pereira, Jorge Ambrósio and Dr. Carla Silva from IST, Prof. Pedro Camanho from FEUP and Prof. Manuel Gameiro from University of Coimbra.

### 1. Mission and objectives

Recognising transports as a decisive factor for the competitive and sustainable development of modern economies the Research Line – TRANSPORTS aims to support the development of transports in terms of policies, optimization plans and management of the sector. Technology development ranks high within this research line.

The main objectives are:

- The development of critical technologies to extend and improve the technology base for well identified critical needs;
- Integration and validation of complex systems and technologies in advanced industrial and operational environments;
- Cross-sectorial research activities for critical technologies common to all surface transport modes and other industrial sectors opportunities are exploited;
- Effective results in clean, efficient, safe and comfortable transportation covering;
- new materials, structures and design for manufacturing;
- aerodynamics, mechatronics, intelligent systems, design and simulation tools,
- product optimization.

### 2. Research structure and staff

The Research Line – TRANSPORTS involves the following research groups of LAETA.

**Mechanical Design (IDMEC, IST)**, Profs. M. Seabra Pereira, Jorge Ambrósio – Vehicle parts, vehicle dynamics, railway dynamics, composites, crashworthiness and passive safety, biomechanics and accident reconstruction

**Intelligent Systems (IDMEC, IST)**, Prof. José Sá da Costa – Intelligent information and communication technologies and logistics

**Manufacturing and Industrial Management (IDMEC, IST)**, Prof. Paulo Martins – Modern technologies and manufacturing process optimization as applied in the automotive industry and railway manufacturers

**Flow Physics and Simulation (IDMEC, IST)**, Prof. J. Carlos Pereira – CFD and aerodynamics for vehicles

**Renewable and Sustainable Energy Systems (IDMEC, IST)**, Profs. Pedro Coelho, Tiago Farias – Biofuels, hybrid technologies, energy and environment in transports

**Design and Experimental Validation (IDMEC, FEUP)**, Profs. Augusto Fernandes, Renato Natal Jorge – Light weight structures for vehicles, experimental testing, fatigue and structural design, biomechanics

**Experimental Mechanics and New Materials (INEGI)**, Prof. J. Silva Gomes – Light weight material and experimental testing, design and manufacturing of composites in transport structures

**New Technologies and Advanced Manufacturing Processes (INEGI)**, Prof. A. Barbedo Magalhães – Manufacturing, industrial processes for transport Industries

**Energy, Environment and Comfort (ADAI – UC)**, Prof. M. Gameiro da Silva – Comfort of vehicle occupants based on simulation and testing, industrial aerodynamics testing.

These groups have a participation in the Research Line – TRANSPORTS with a varying degree of involvement.

The research staff of the all groups referred to above includes 187 PhDs as well as 97 PhD and MSc students, the majority being PhD Students. It should be noticed that as a result of the varying levels of contribution for the Research Line – TRANSPORTS, not all of these researchers are involved in transport related research. However, there are 15 PhD researchers working full time on different projects.

### **3. Research Projects**

This Research Line has an outstanding record in participation and leadership in European projects in the transport area. More than 50% of the funding of this research line comes directly from European Framework Programs.

This Research Line also has a very active direct collaboration with relevant transport Portuguese, European and Japanese major industries

The different research groups are also actively involved in FCT funded projects in transport technologies and also in collaborative projects sponsored by the Innovation Agency, Minister of Economy funding programs and from industry. About 40% of the funding is obtained in this framework.

#### 4. Research output – Publications and degrees

INDICATORS	2003 – 2007	2008
Books	20	4
Chapters in books	48	7
Papers in peer review journals (international)	289	46
International conference proceedings	267	86
PhD completed	75*	25*
Masters completed	134	37
Patents	9	2
Prototypes	30	1
Organization of Conferences/seminars	57	12
Editorial Boards	34	34

\*It includes PhDs from all groups related to the area of Transports.

#### 5. Conclusions and Recommendations

The Research Line – TRANSPORTS has a very good record of publications in prestigious journals in transports and in the general areas of Applied and Computational Mechanics both in fundamental and applied research.

Several members in this research line are internationally known and leaders in their research areas, namely by participating in Editorial Boards of major journals and organizing very important international scientific conferences.

This research line is very active in participating in research projects and collaborative work with industry at national and international level.

The 15 full time research researchers contracted under the Science Program are well integrated in the research plans and activities of this research line.

LAETA was created in June 2008 and is making a visible effort to better integrate the different research groups around the main mission and objectives stated for the transport area with a stronger collaboration between the different units involved.

The Laboratory facilities should benefit from an active effort in updating equipment. Contracting 3 laboratory technicians has been identified as a major measure crucial for the development and enhancement of experimental activities.

All new research staff to be hired for LAETA should be actively involved in multidisciplinary research projects with the collaboration of different units.

The idea put forward during the presentation to organize every two years a transport workshop will contribute significantly for collaborative and interdisciplinary research between different units.

A handwritten signature in black ink that reads "Werner Schiehlen". The script is cursive and fluid.

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Germany

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