

# INTRODUCING THE ORGANIZATION OF TRANSPORT STUDIES

## VTT TECHNICAL RESEARCH CENTRE OF FINLAND

Mikko MALMIVUO

Customer Manager, VTT, Finland

VTT Technical Research Centre of Finland is the biggest contract research organisation in Northern Europe. The 2700 employees of the organisation carry out research work in various research areas including information technology, industrial engineering, biotechnology, chemistry, building, energy, environment as well as transport, traffic and logistics.

The history of VTT starts from 1942, when Finland decided to establish a new and independent, government-owned research institute. Its mission was “to engage in technical research for the benefit of science and society”. During the Second World War VTT’s activities were closely linked to research and testing for military purposes and civil defence. The research work for private companies and for the benefit of public interests started to grow and expand gradually after the war.



VTT initially had ten separate laboratories. The road laboratory, the laboratory dedicated for road construction and road material testing, was one of the first laboratories. The growing traffic also created a need for transport studies, and finally in 1972, the name of the “Road Laboratory” was changed to “Road and Transport Laboratory”.

During the years 1970 to 1995 VTT made several fundamental national traffic studies which built the basis for the well-known and high level of traffic safety in Finland. In 1995 Finland joined the European Union and the membership boosted soon the European wide research cooperation and projects. During the last decade VTT’s transport related research has established its role as an important key organization in several European transport research areas. VTT has been seen regularly as a leader or partner in EU transport research projects regarding:

- Transport telematics, especially regarding impact evaluation,
- Driver behaviour and traffic signs,
- Strategic assessment of transport

policies,

- Intermodal railway-road research,
- Trans-European road network optimisation.

### ROAD AND TRANSPORT RESEARCH IN VTT TODAY

VTT’s transport, logistics and road structure research employ about 200 hundred people . VTT is one of the few international research organisations which carries out research in all transport modes: road, rail, water and air . VTT specializes in research of:

#### Information technology in the optimisation of logistics

VTT uses the latest information technology when developing production-oriented information systems supporting decision-making for the optimal control of transport. Methods related to systems research are used at the strategic, tactical and operative levels. Fleet management (FM) is applied in a physical network, where vehicles move following a given task list.



VTT carries out transport research in all transport modes.

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### Energy consumption and the environmental impact of transport

VTT's focus is on the energy consumption of transport, and how the emissions caused can be reduced. Expertise extends from fuels and engines to the development of purification technologies for exhaust fumes. Research environment includes equipment suitable for measuring both heavy vehicles and passenger cars. Research scientists manage complex interactions between vehicles, power equipment, fuels, emissions and total energy supply. This field of activity also includes extensive assessments of fuel and energy chains at the system level.

### Transport systems

The focus areas of transport system research include travelling behaviour, transport models and predictions, transport policy, public transport, goods transport and the economic, environmental and social impact of transport. VTT develops planning methods and their utilisation in transport, passenger information, as well vehicle and payment systems.

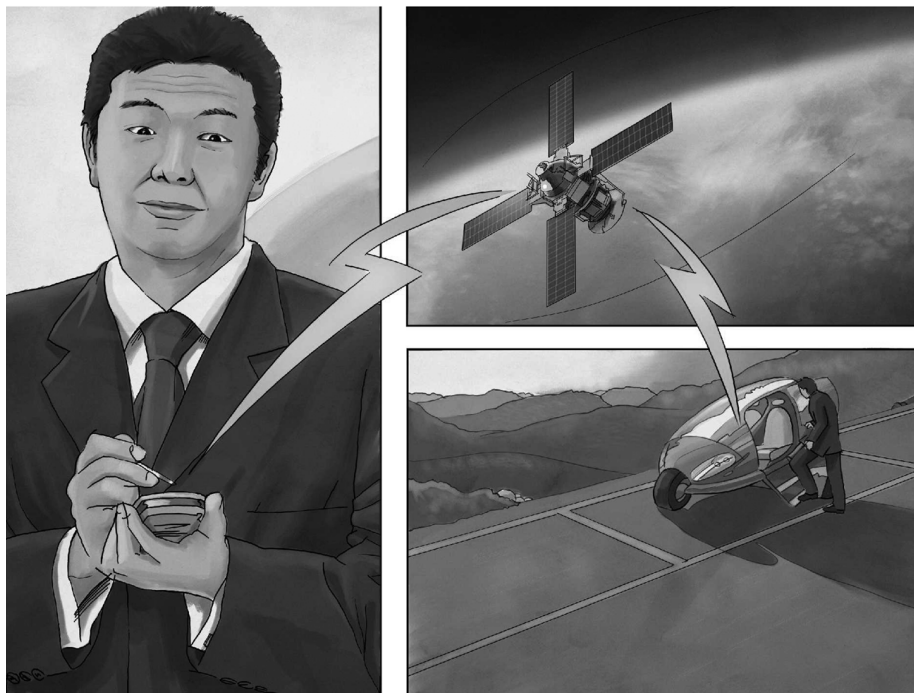
### Road transport

Road transport, which comprises both passenger and freight transport, is one of VTT's key focus areas in transport research. Traffic safety is often emphasised. The main focus in improving safety is placed

on the infrastructure of the transport system, operators and road users. VTT enhances competitiveness in the industry and transportation sectors by developing new logistic solutions and new innovations that support public decision-making concerning transport solutions.

### Aviation and air transport

VTT's broad expertise can be applied to a number of subjects in the field of aviation and air transport – the high cost of fuel, environmental aspects, strong competition and security aspects bring new challenges to the aviation industry. VTT possesses solid expertise in aircraft life cycle management and the verification of new structures.



In the project "The Finnish Ecocity for the Future in China" VTT is studying the possibilities to build a modern ecological high-tech city in Tianjin, China. One of the visions is, that the primary means of transport in the city would be "Cybercap", automatic Taxi.



In the European AIDE-project VTT has developed the module which is intended to detect whether the driver is under visual or cognitive workload. The overall scope of the AIDE project is to enable adaptation of an in-vehicle HMI according to the driver's momentary state. This was one of the first attempts in world wide to fuse driver environmental measures, vehicle statuses and driver's dynamical behaviour and schedule the user interface to provide information in an appropriate moment.

### Rail transport

VTT's cross-disciplinary services generate added value for the customers in the field of railway transport. The projects vary from strategic analysis and transport policy research to in-depth technology solutions and safety analysis. By combining the system and technology expertise VTT can offer customers a high level of service. Research also covers devices, technologies and systems. Environmental impacts, such as ground borne vibrations and noise reduction questions have been studied in several projects during recent years.

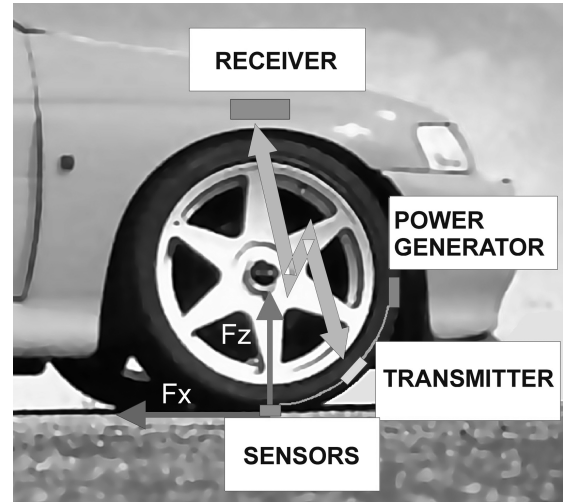
### Maritime transport and harbours

VTT offers a wide range of research and development services related to maritime and harbour op-

erations. The key objective is to improve maritime safety and, as in all operations, observe the environmental aspects. Projects supporting the aim to improve maritime safety focus on preventive design, in which the use of various risk management tools is essential. VTT participates in the development of risk management tools, observes the industry's developments and applies new, efficient methods to improve safety in the transportation value chain. Cost and benefit calculations, combined with environmental values, form a substantial part of the research.

### Structural technology for the development of infrastructure

VTT research also comprises research on structural technology of infrastructure: pavement and road



In the APOLLO-project, VTT and European car and tyre manufacturers studied intelligent tyres, including in-tyre sensors, which are able to monitor road conditions. During recent years VTT has participated in several projects dealing with innovative methods for monitoring road conditions and friction.

structures, geotechnology, bridges and tunnels. The main topics are modelling and monitoring of structural behaviour and development of new structural concepts and construction methods as well as maintenance. Projects have lately focused more often on life cycle cost and life cycle assessment analysis with various materials and structural elements. Harsh sub-arctic climate and various frost actions provide the background to develop functional and eco-efficient solutions both for the public and private sector.

## EXTENSIVE INTERNATIONAL NETWORK

VTT is a well-known partner in many international organisations. VTT is a member of the following





Ship handling simulator, test facilities for energy use and emissions from heavy vehicles as well as road surface measurement system are examples of the variety of VTT research facilities.

organisations:

- EARPA European Automotive Research Partners Association
- ECMAR European Co-operation in Maritime Research
- ECTRI European Conference of Transport Research Institutes
- ERTICO ITS Europe
- FERSI Forum of European Road Safety Research Institutes
- ICTCT International Cooperation on Theories and Concepts in Traffic Safety
- IEA-AMF Implementing Agreement on Advanced Motor Fuels
- IEA-HEV Implementing Agreement on Hybrid and Electric Vehicles
- IMO International Maritime Organisation
- ISSC International Ship Structures Committee
- ISSMGE The International Society of Soil Mechanics and Geotechnical Engineering
- OECD ITRD International Transport Research Documentation
- TRB Transport Research Board
- UITP International Union of Public Transport

VTT has small branch offices outside Finland. At the moment VTT has such contact points in Silicon Valley (USA), St Petersburg (Russia), Shanghai (China) and Seoul (South Korea, under construction). Also half a dozen independent sale agents around the world are offering VTT expertise to customers abroad.