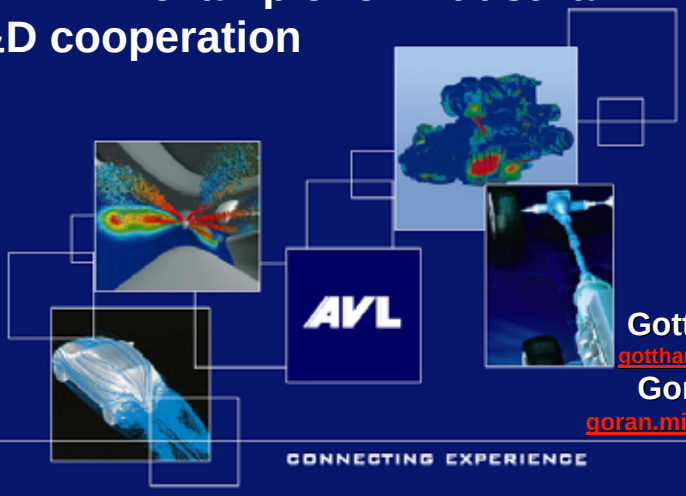
3rd Austrian- Croatian Science Day, Graz

AVL – An example for industrial R&D cooperation



Gotthard Rainer
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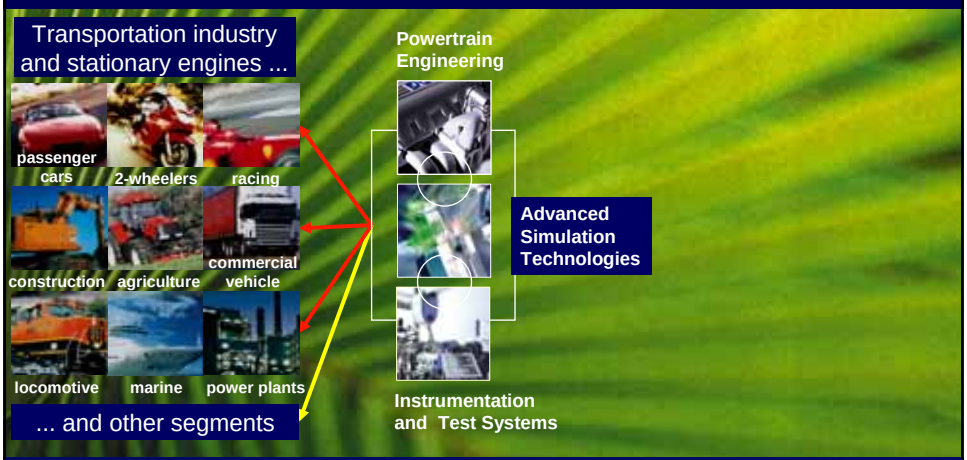
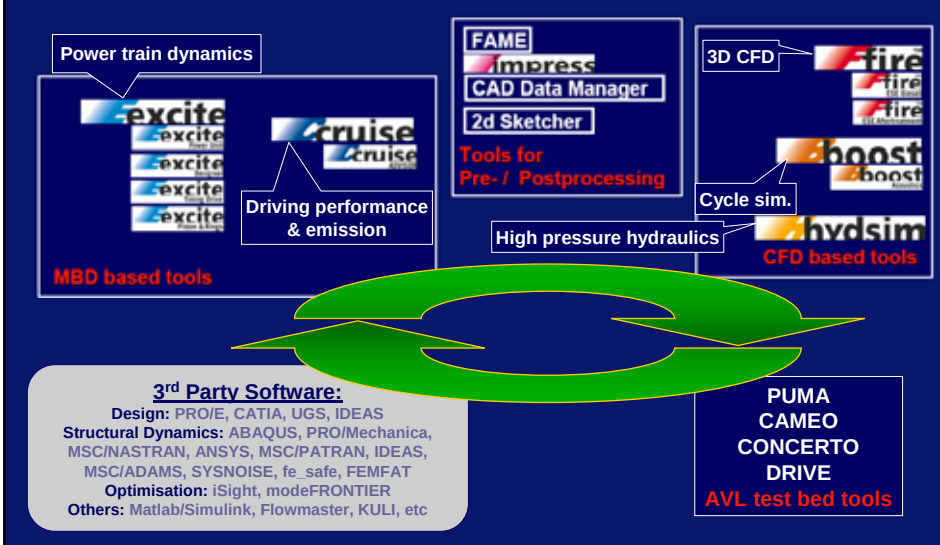
AVL- the company



- AVL possesses the engineering and testing know-how for the entire power train development process.
- That know-how enables us to generate both complete and task-specific solutions.

AVL – a worldwide partner

AVL- simulation software- product portfolio



AVL-AST d.o.o.: the company

Powertrain Engineering (PTE)

Advanced Simulation Technologies (AST)

Instrumentation and Test Systems (ITS)

AVL-AST d.o.o.
Av. Dubrovnik 10, Zagreb

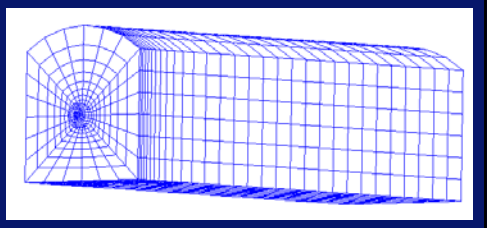
founded in 1996 (Affiliate of AVL List GmbH, Graz)

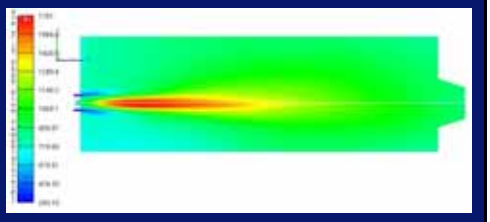
Employees	**(1996):**	**6**
	(2007):	**63**
Education:	**Dipl.-Ing, PHD, Mag. Mechanical eng., Electrical eng., Computer science, Mathematics**	

Tasks:
- **Software development for AST & ITS**
- **Powertrain simulation for AST & PTE**
- **Customer support for AST**

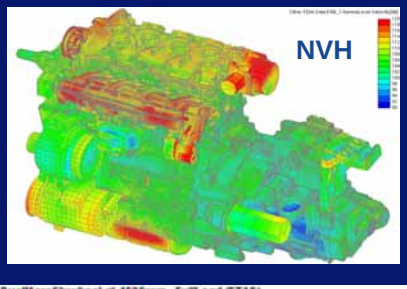
Cooperation with University Zagreb (FSB)

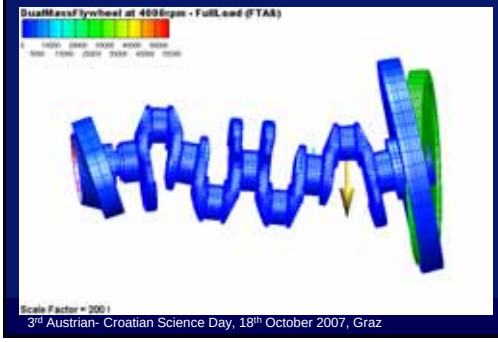
- **since 2001: AVL is financially supporting postgraduate students**
- **2-3 students working on CFD combustion model development**
- **Models usable for industrial burners and IC engines**
- **New models are implemented in AVL FIRE**





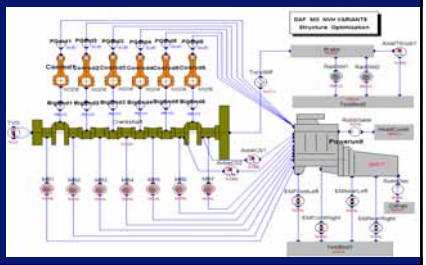
Simulation (Example): Powertrain NVH





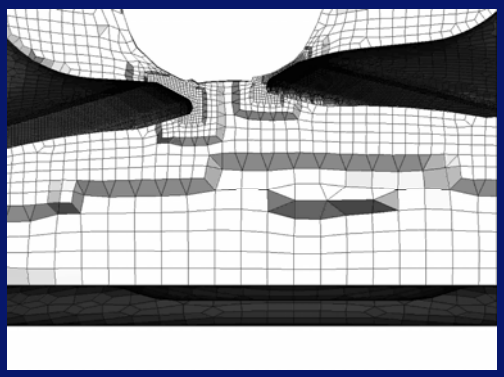
Mechanical Analysis

- NVH
- Crankshaft Dynamics & Strength
- Exhaust Systems TMF
- Main Bearing Wall Strength
- Con Rod Dynamics&Strength
- Head-Block Compound

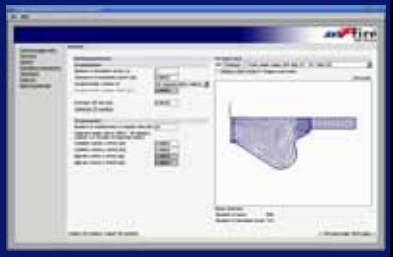


Development (Example): CFD Mesher

3D Mesh- grid refinement

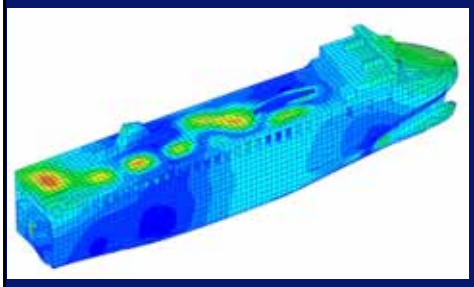


2D Mesh- grid refinement



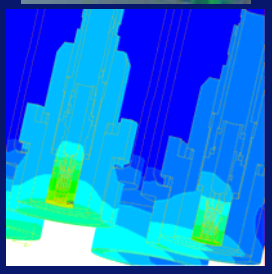
Simulation (Examples)

Ship vibration



Detailed vibration analysis of a ship including the ship structure, engine, transmission and shaft line system using EXCITE (for FSG shipyard)

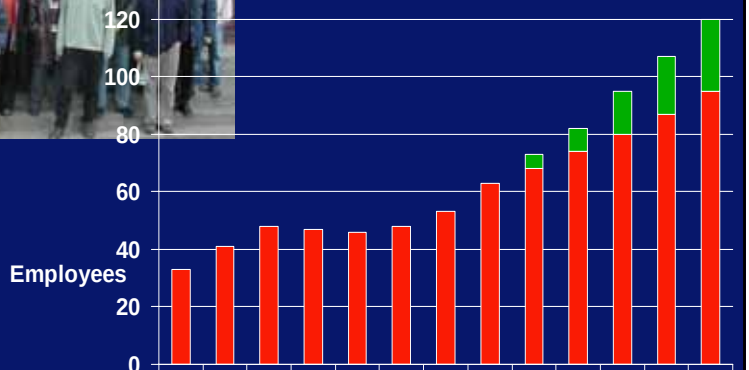
Pressure sensors



Detail analysis of pressure sensors in combustion chamber

Past growth & future plans of AVL-AST

- 1996: 9 employees
- 1999: 18 employees
- 2007: 63 employees
- 2008- 2012 (plan): +25 empl. with funding



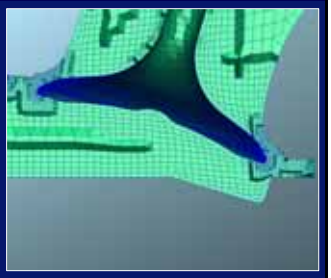
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
growth w funding									5	8	15	20	25
regular growth	33	41	48	47	46	48	53	63	68	74	80	87	95

Proposal for BICRO project: New CFD mesher

AVL

AVL applied in Croatia for funding by BICRO to perform a challenging project for engine combustion simulation

- 3 years project
- 6-8 SW additional developers, 3 positions already confirmed in advance
- New semi-automatic meshing tool for IC engine in- cylinder flow and combustion simulation
- Improves efficiency and saves time during the CFD mesh generation of IC engine
- funding is not insured up to now



Further planned projects

AVL

Growth is depending partially on regular projects and on strategic projects, e.g.

- General Graphical User Interface Library (ACT)
- Result presentation (Virtual Reality)
- Integration of Simulation in Design (CAD)