



KULI Overview (Today and Tomorrow)

ECS, Rolf Salomon



- *Motivation*
- *History / Experience*
- *KULI Community*
- *KULI Road Map*

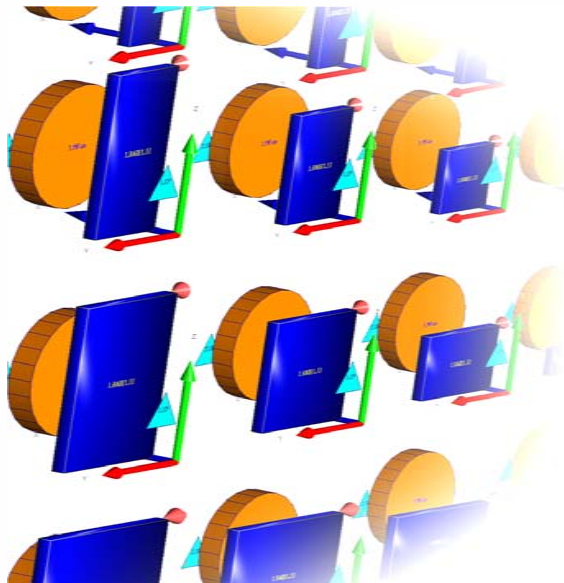


Simulation vs. Test

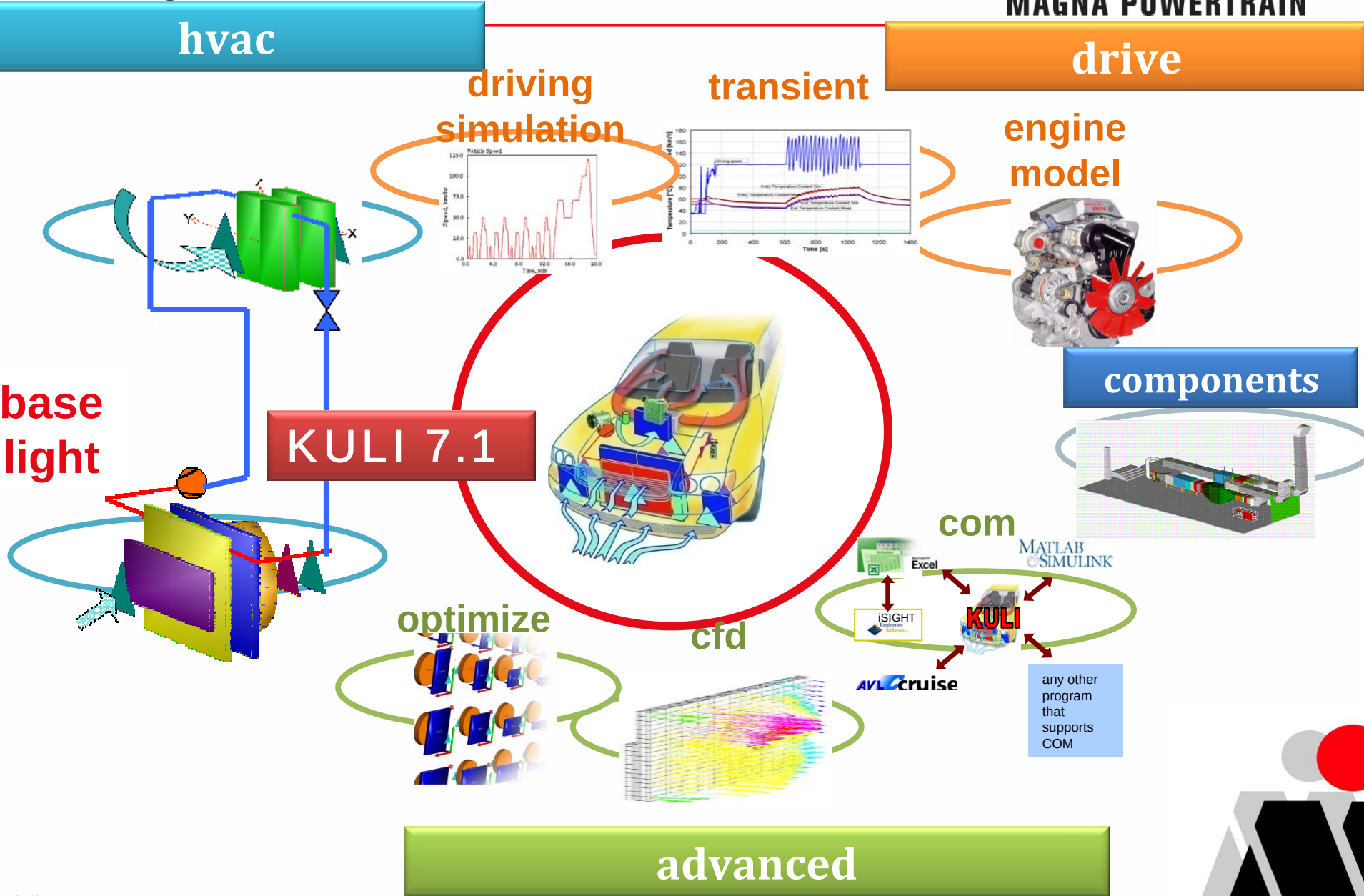
or „How to find the Optimized Solution“

如何找到最优化解决方案

- **Diversity of Variants**
多样性的变化
- **Concentration on Promising Concepts**
关注最优潜力的设计理念
- **Repeat Accuracy**
具备再现性高的精度



Heat Management with KULI



20 Years KULI Experience

1982	Software concepts
1987	First useable program code (F77)
1991	First external customer
1995	Windows-Version with GUI
1998 - 2000	Modules KULI ADVANCED, AC, DRIVE
2001	KULI 5.0 fluid circuit and more
2002	Driving simulation, fan parameter etc.
2003	KULI 5.1 with engine model, vehicle body
2004	KULI 5.2 with V- and boxer engine model
2005	KULI 6.0
2006	KULI 7.0, KULI components
2007	KULI 7.1, EGR, Turbocharger etc.



Who are Customers?

CAR

AUDI (D)
BMW (A)
BMW MOTORSPORT (D)
CHRYSLER (USA)
DAIMLER VAN (D)
FIAT/CRF (I)
HYUNDAI KIA (ROK)
JAGUAR (GB)
LAND ROVER (GB)
PATAC (CN)
PORSCHE (D)
MAGNA STEYR FAHRZEUGT. (A)
SOUTH EAST MOTOR (CN)
TATA MOTORS (IND,GB)
VOLVO CAR (S)
VOLKSWAGEN (D)

UNIVERSITY

Hawks Racing Team (D)
Kompetenzzentrum vif (A)
Jiao Tong University (CN)
Newcastle University (GB)
Tongji University (CN)
Swinburne University (AUS)

TRUCK / BUS

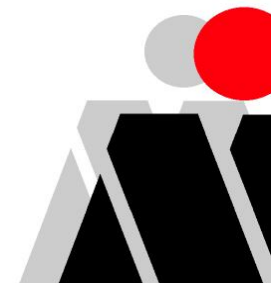
ASHOK LEYLAND (IND)
DAIMLER TRUCKS (D)
DONG FENG (CN)
FAW (CN)
FREIGHTLINER (USA)
HINO (J)
HYUNDAI (ROK)
INTERNATIONAL (USA)
IVECO (I)
KENWORTH (USA,MEX,AUS)
MACK (USA)
MAN (D)
PACCAR (USA)
PETERBILT (USA)
RENAULT TRUCKS (F)
SCANIA (S)
SHAC (CN)
STERLING (USA)
TATA MOTORS (GB,IND)
UNIMOG (D)
VOLKSWAGEN (BR)
VOLVO BUS (S)
VOLVO TRUCK (S,USA)
WEICHAI POWER (CN)
WESTERNSTAR (USA)

SUPPLIER

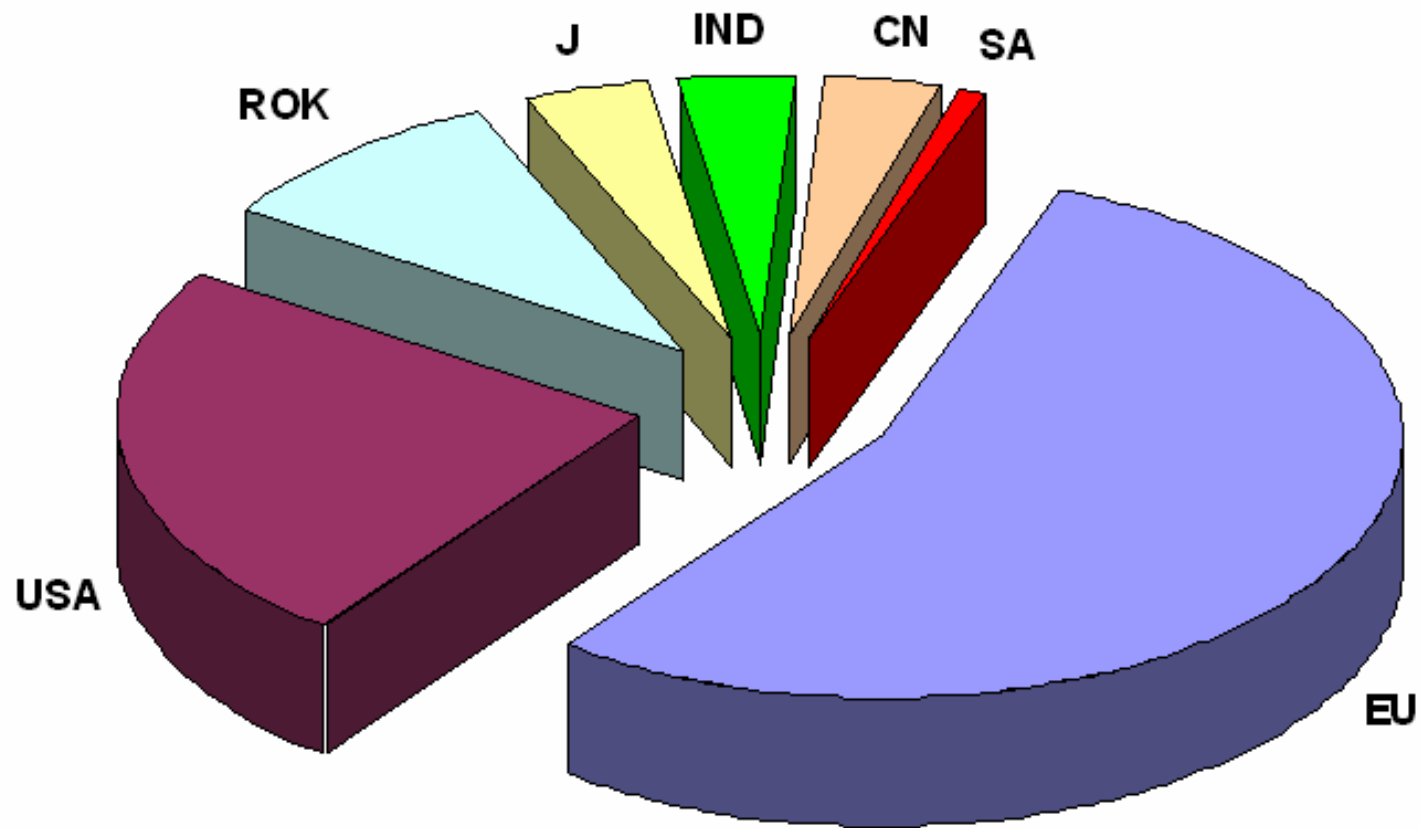
ADAMS THERMAL SYS. (USA)
AKG (D)
BEHR (D)
BORG WARNER (D)
CALSONICKANSEI (GB,D)
DAI-HAN CALSONIC (ROK)
DELPHI (L,D,USA)
DENSO (J,GB,D,I,USA)
DEUS (P)
DOOWON CLIMATE CONTROL (ROK)
HYDAC (CH,D)
KALE (TR)
KTM-KUEHLER (A)
KTR KUPPLUNGSTECHNIK (D)
MITSUBISHI HI (USA)
MODINE (D,USA,BR)
ORDONEZ (E)
RAAL (RO)
SAMSUNG CC (ROK)
SETRAB (S)
TATA TOYO RADIATOR (IND)
TOKYO RADIATOR (J)
VALEO (EC,USA,BR)

VARIOUS

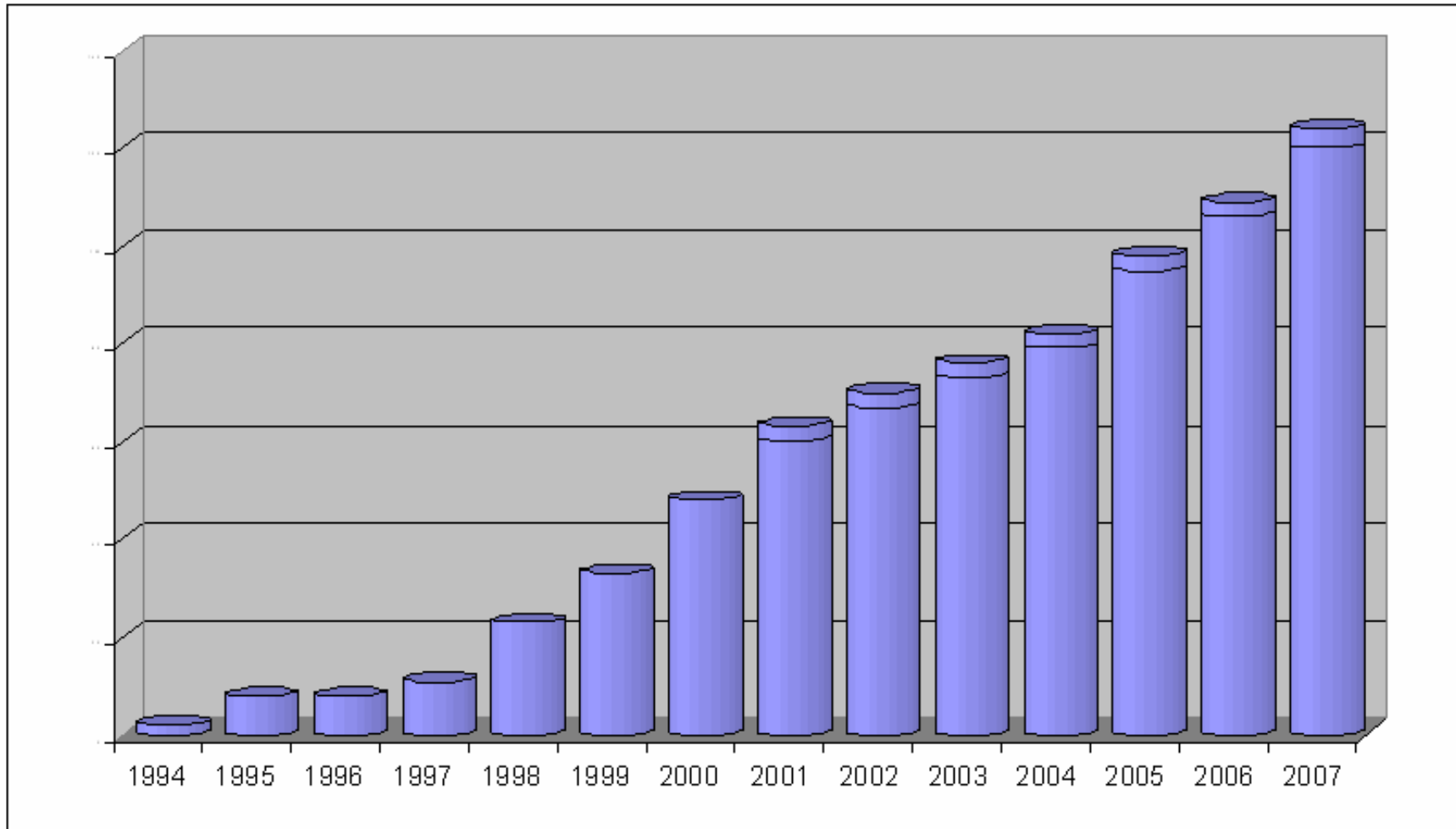
AGCO/FENDT (D)
AGCO/VALTRA (FIN)
AVL (A)
BERTRANDT (D)
CATERPILLAR (USA)
CUMMINS (USA)
DEUTZ (D)
DOOSAN (ROK)
EMP (USA)
HYUNDAI HEAVY IND. (ROK)
IAV (D)
JC BAMFORD (GB)
JOHN DEERE (USA,D)
KATECH (ROK)
SAME DEUTZ-FAHR (I)
SOBRIETY (CZ)



Where are the Customers?



Growth Worldwide



User Meetings (Steyr)



2007



2005



2003



1997



1999



2001



KULI Development & Support Team

- The ECS KULI team also conducts projects
KULI团队的项目支持能力
 - Complete projects from data acquisition to results
支持从数据获得到结果输出的完整项目能力
 - Startup projects to get started
Possibility to include 包括
 - 3D CFD simulation 三维CFD模拟
 - Component tests (radiator, fan) on component test rig 零部件台架测试：散热器、风扇
 - Delta T measurements 温度波动测试
 - Etc. 以及其它
- The ECS KULI team offers
KULI团队将提供
 - Decades of experience from various projects
几十年的工程经验
 - Knowledge of the latest KULI features
最新的KULI特性
 - Close cooperation between development team and project team
开发部门与项目部门之间紧密协作



Road Map 2008 –2009 (KULI 8.x)

- KULI base
 - New Postprocessor (Monitor)
新的后处理器
 - Combined Components
- KULI hvac
 - Automatic Adjustment of Components
可自动调整零部件数据
 - New Cabin Model
新的乘客舱模型
 - Monolithic heat exchangers
- KULI advanced
 - Statistics
统计分析
- KULI drive
 - Improvement of Transient Simulation
改进的瞬态模拟
- Integration of KULI + FASI
KULI和FASI的整合

KULI to become the overall tool for:
KULI将会成为全局化的工具平台用以

- Energy management
能量管理
- Heat Management
热管理
- Driving Simulation
行驶模拟
- Alternative drive trains (fuel cell, belt less,....)
可选择的传动系统
- Alternative coolants and refrigerants (zeolite, crystalloid,..)
可选择的冷却液以及制冷剂
- Integration of new components (latent heat storage,...)
集成化的新零部件模型





Thank you for your attention!

