

**ERTICO – ITS Europe General Assembly & Partner Session on ITS Success  
Stories**

# **The Prometheus Vision**

## **Presentation of ITS Success Stories**

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## Review on Objectives and Visions

# 1985

### The Vision:

Creating „Intelligent Vehicles“ as part of an overall „Intelligent Road Traffic System“

Eureka Project Prometheus

1985 - 1994



**Programme** for a **E**uropean **T**raffic with **H**ighest **E**fficiency and **U**nlimited **S**afety

**The Strategic Objective:** “Prometheus is a European Research Program which will elaborate the technical base for advance in the development of road transport. The objective is to create concepts and solutions which will make traffic perceptibly safer, more economical, with less impacts on environment, and will render the traffic system more efficient.”

Eureka Project Prometheus

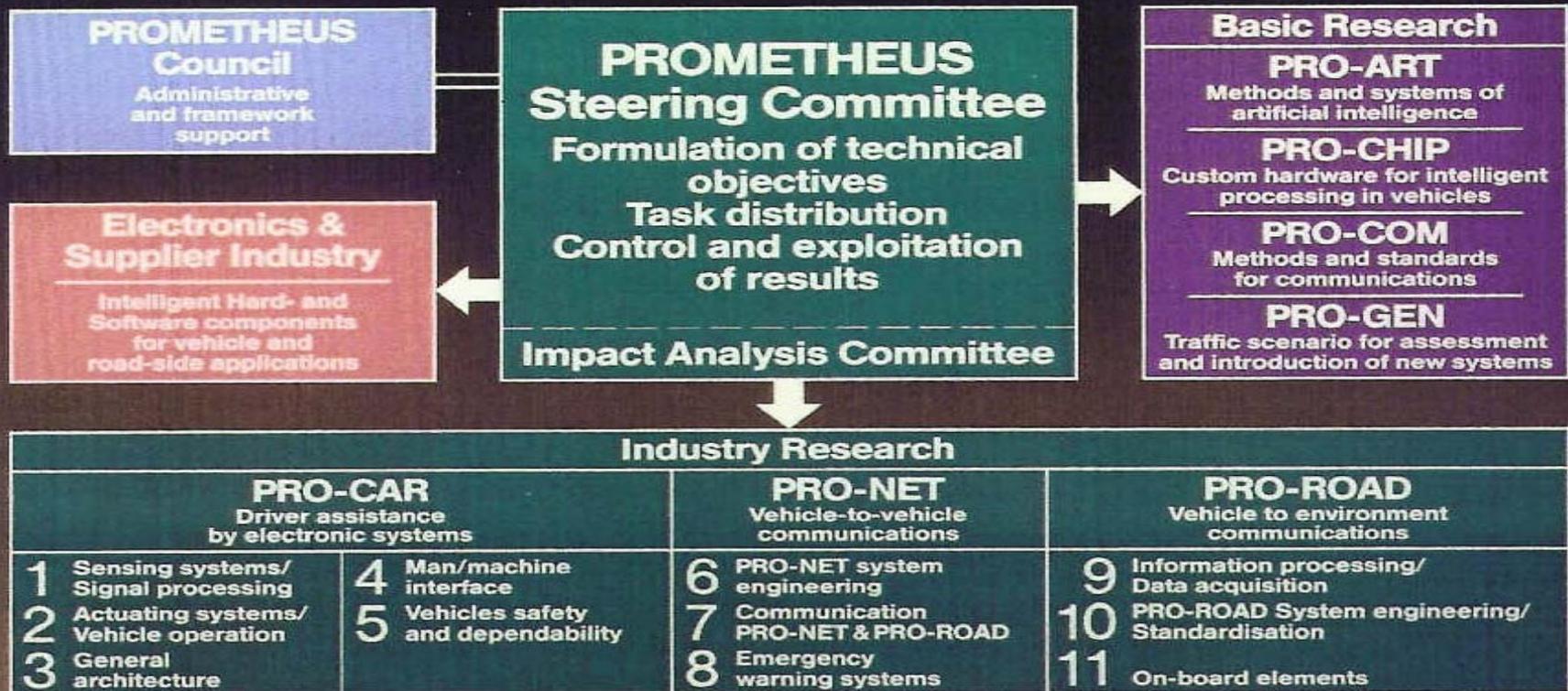
1985 - 1994



**P**rogramme for a **E**uropean **T**raffic with **H**ighest **E**fficiency and **U**nprecedented **S**afety

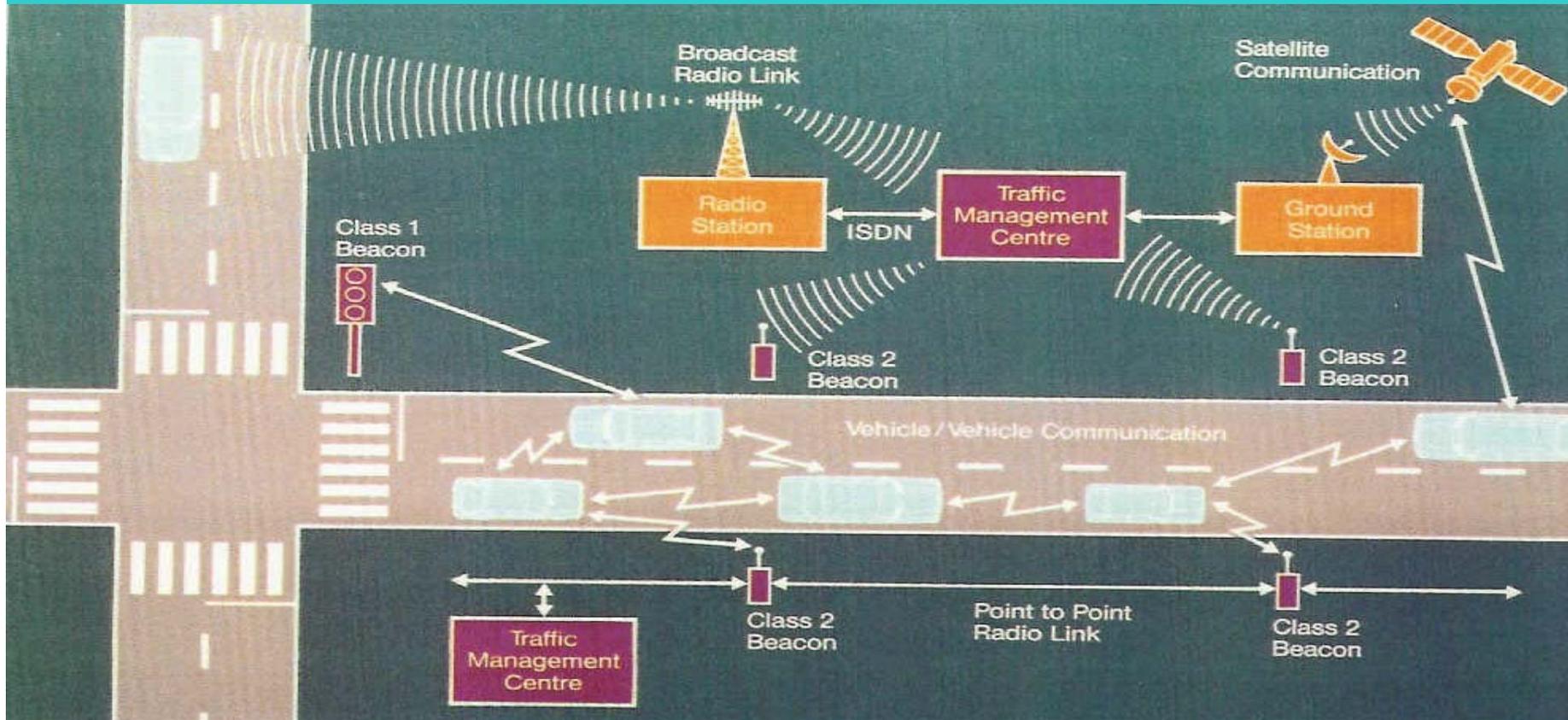
**The R&D Objective:** “ Prometheus intends to fully exploit the potential of information and communication technology, micro-electronics, sensors and actuators and to adapt progresses in technology to the capabilities of human beings in order to create an optimum interaction between man and machine in road traffic.”

## Prometheus – Structure and Research Tasks



**Strategic Approach: From the product “Vehicle” to the product “traffic”.** Considering the high complexity of the program, it had been started and planned carefully and installed a new form of cooperation between industry, basic research entities and governments in order to integrate all relevant partner just from the beginning.

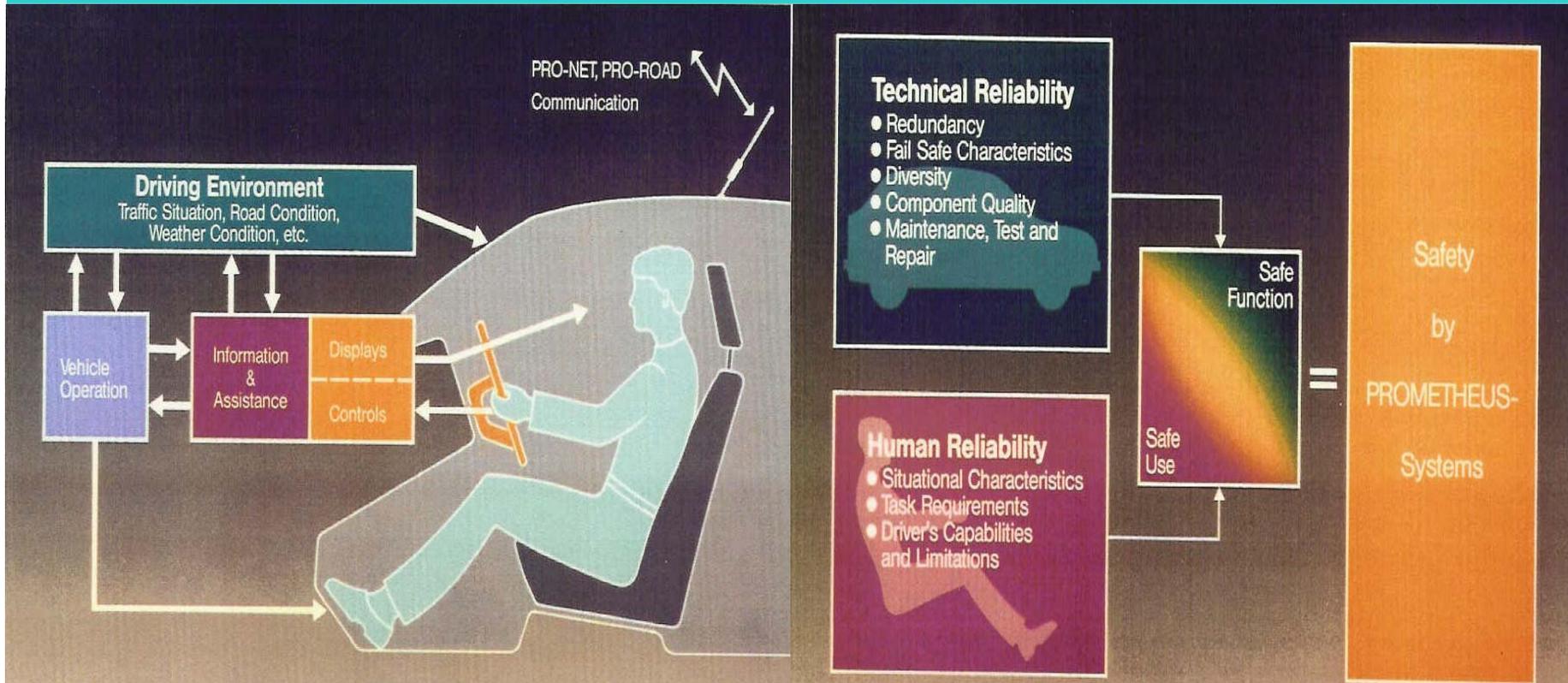
## Prometheus – Communication for Pro-Net & Pro-Road



**Pro-Net:** Development of a communication network between vehicle-computers, enabling the vehicle to be driven safely by means of “electronic sight”, increasing the perception area of the driver.

**Pro-Road:** Development of a roadside communication and information system to assist the driver and/or the onboard-computer to enable higher level traffic management functions.

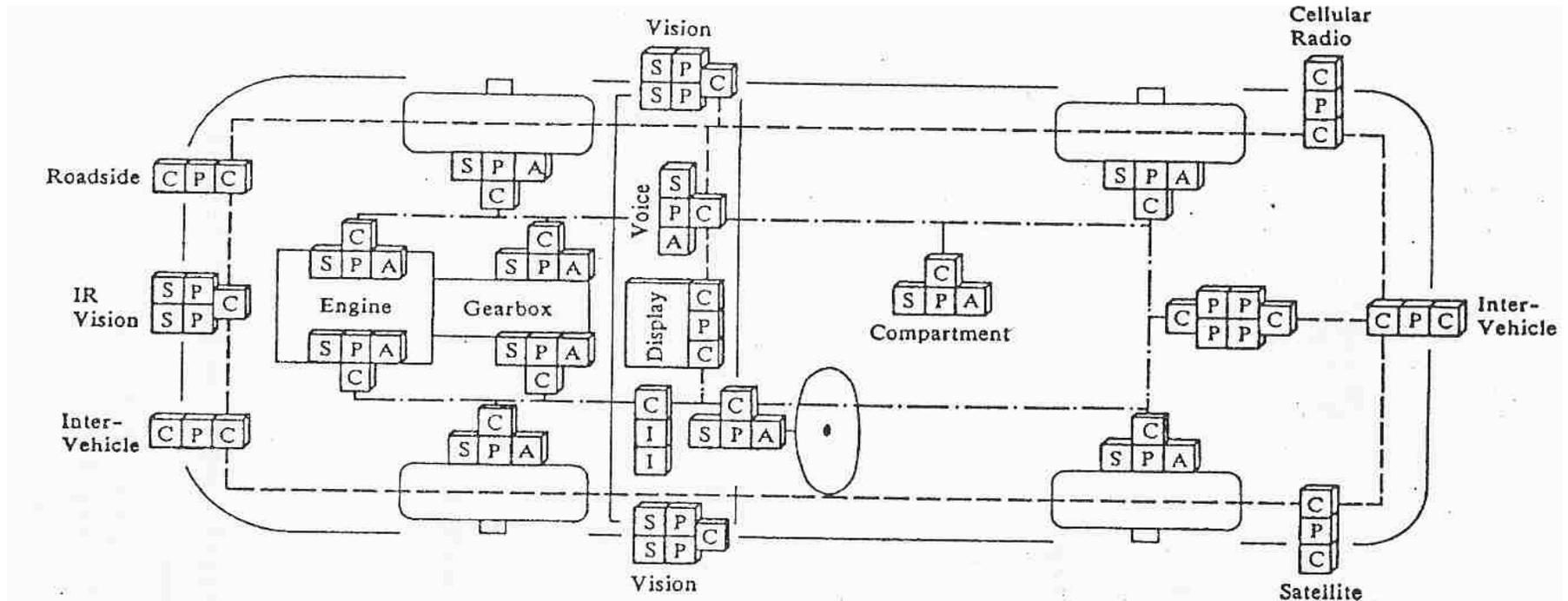
## Prometheus – MMI and Safety concepts in Pro-Car



### Pro- Car: Development of

- Computer-assisted systems in vehicles to assist and relieve the driver
- MMI- concepts to support safe interactions between driver and computer-assisted systems.
- Reliable, safe and high quality Hard- and Software and concepts for diagnosis, service and maintenance.

## Prometheus- Basic Research Programs Pro- Chip and Pro- Art



Vision 1995: 100 Sensoren (S), 100 Prozessoren (P), 80 Aktuatoren (A),  
 200 Kommunikations Interfaces (C), 40 Indikatoren (I), 5 Displays (D),  
 4 Vision Systeme (V)

**Pro-Chip:** Development of the integrated microelectronics required for a Prometheus vehicle with advanced on-board automotive electronics  
**Pro- Art:** Methodological investigations of applications of Artificial Intelligence for signal processing and decision making processes.

## Prometheus Success Factors

- **Strategic Element 1:** **Strategic Opportunity** for the partner to strengthen their position in a field of strong competition with the Japanese and North American Automotive Industry.
- **Strategic Element 2:** **Operational Opportunity** to participate in a significant broader approach of research activities in a completely new technology and product segment than it would have been possible when acting alone. Important was the agreement to restrict the activities to research topics of joint interest and not to enter in product development areas.
- **Strategic Element 3:** **Tactical Opportunity** to learn from others and to receive financial and political support to build up capacity and know-how in advanced automotive electronics.

The Strategic Approach of  
**Cooperation in Competition**

## Prometheus Success Factors

**Management Element 1: The System Approach:** A comprehensive project plan with detailed work break down structure covering the whole field of application was distributed at the beginning to demonstrate the importance and the attractiveness of the project and the competence of the initiator company.

**Management Element 2: The Integration Approach:** A step-by-step team building process was used, starting the next step only if the previous was stable: Inviting first the German Automotive Companies in order to build a strong core-team, than the French, than the Italian and the Swedish and British companies and than let these companies to form their national basic research and institutional programs.

**Management Element 3: The Leadership Approach:** Building a strong Steering Team of the Automotive Companies to manage the project of 11 Automotive Companies, 103 Supplier Companies, 124 Research Institutes.

**Management Element 4: The Delegation Approach.** Delegating well defined sub-tasks ( Thematic Projects and Basic Research Tasks) to a team of „European Lead Researchers and Scientific Coordinators“, forming Special Committees for instance „Impact Analysis“, „Legal Matters“, „Public Relations“.

The Management Approach with  
**A High Quality Top – Down Start Concept**

## 10 years later

1995: Hans- Herrmann Braess (BMW):  
ATZ Automobiltechnische Zeitschrift 97 (1995)

„ Prometheus- Vision of „The intelligent Vehicle on  
„The intelligent road“

Attempt of a Critical Assessment

„It is difficult to see even from the position of 1995  
new strategic approaches, which may go beyond those  
of the Prometheus vision“

**The Objective of Prometheus is still fully valid**

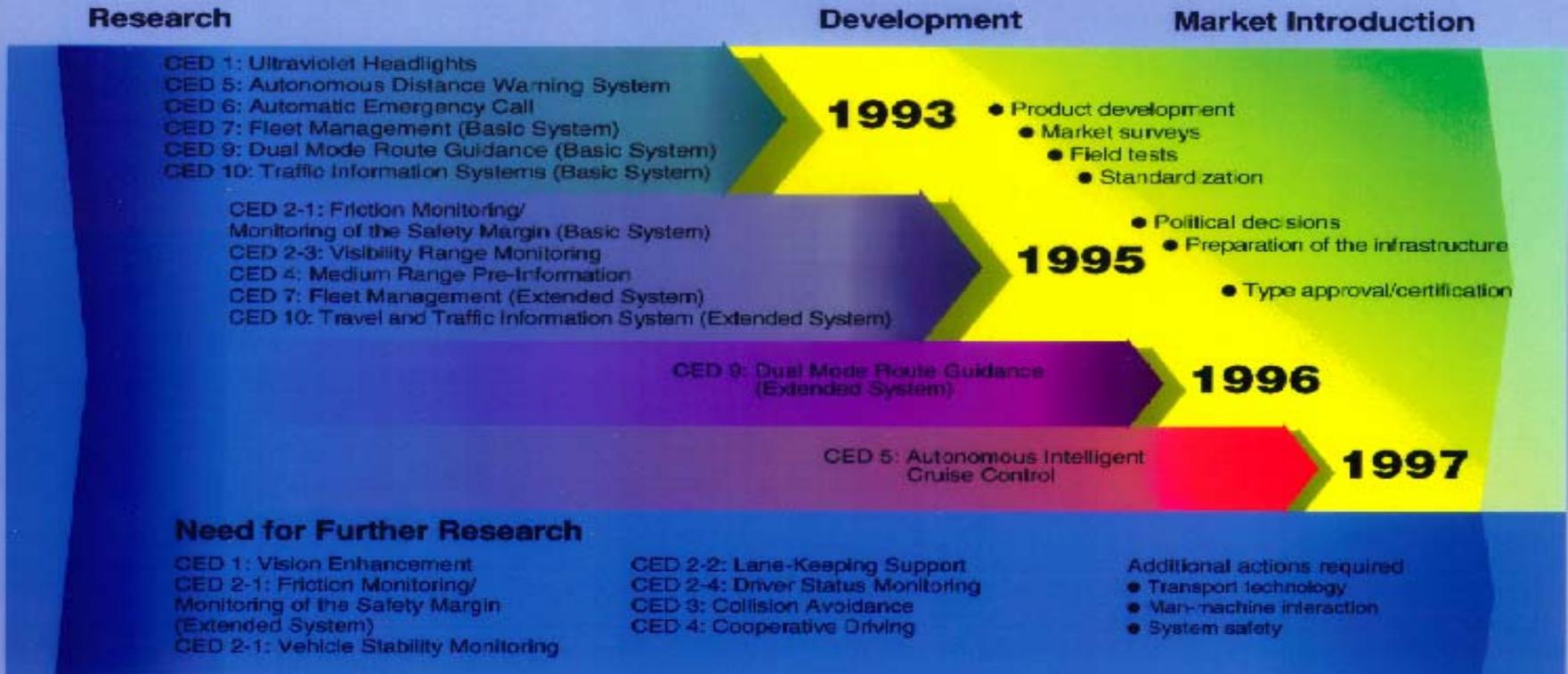
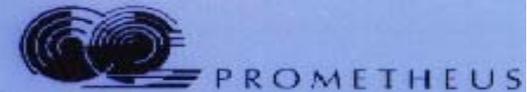
## Prometheus Success Factors – What was missing ?

A Completion of the Vision by

- **Feasibility Studies**, indicating „missing links“ in the short- to mid-term technological development.
- **Roadmaps** towards Commercialisation
- **Implementation Plans**
- **Committed Milestones**
- **Monitoring** Status versus Plan

The restriction to Joint Research activities was necessary in order to allow the application of „Cooperation in Competition“ but in course of time the necessity of well defined Roadmaps towards Development and Market Introduction becomes obvious and the definition of Milestones and Implementation Strategies were required.

# Milestones for the Implementation of PROMETHEUS Systems



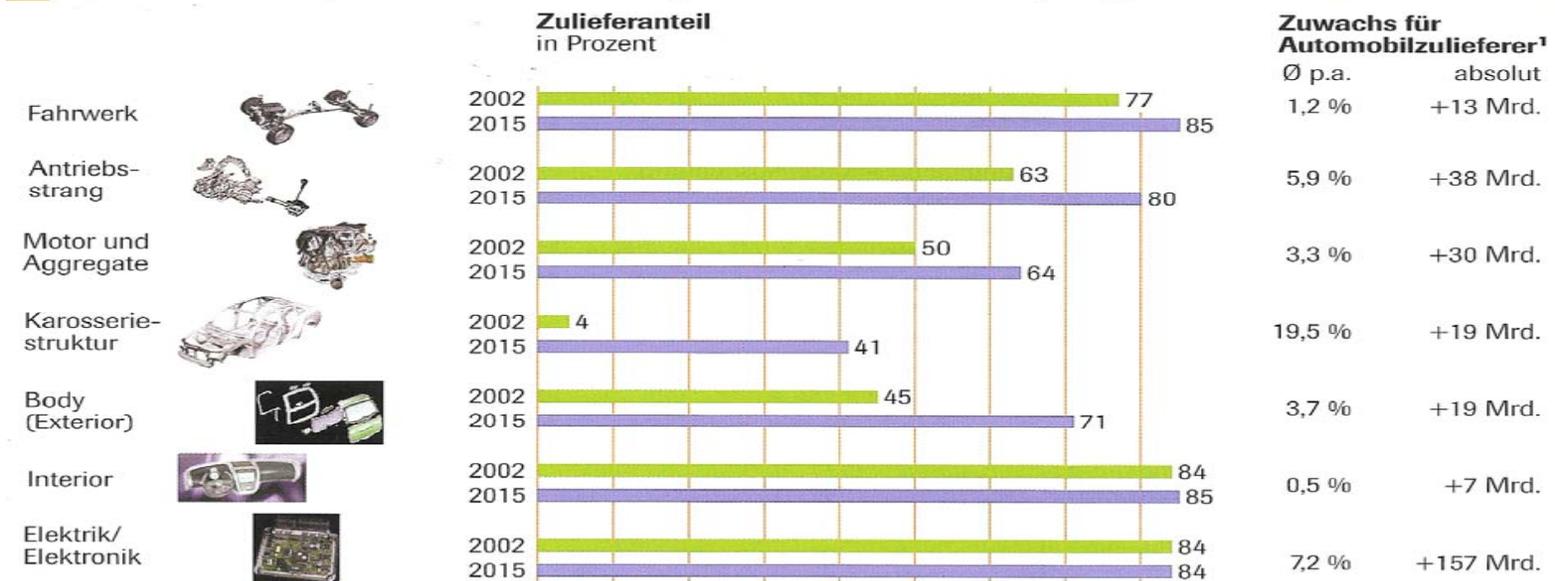
From Vision to Commercialisation: The Roadmap Plan

**20 years later**

**2005**

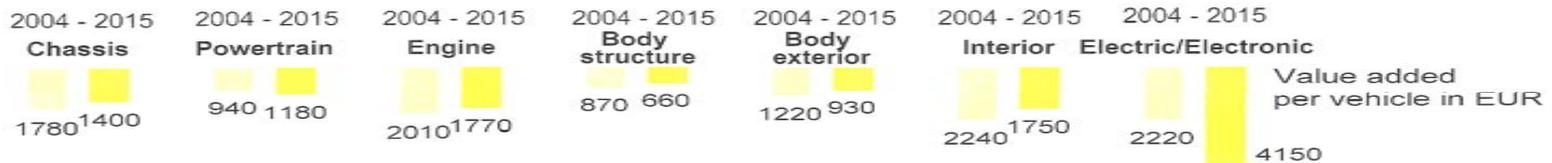
# 20 years 2002/4 – 2015 Perspectives for the Development of segments in the Automotive Industry

## Hauptmodule: Entwicklung der Zuliefererwertschöpfung 2002 bis 2015



<sup>1</sup> inklusive Dienstleister

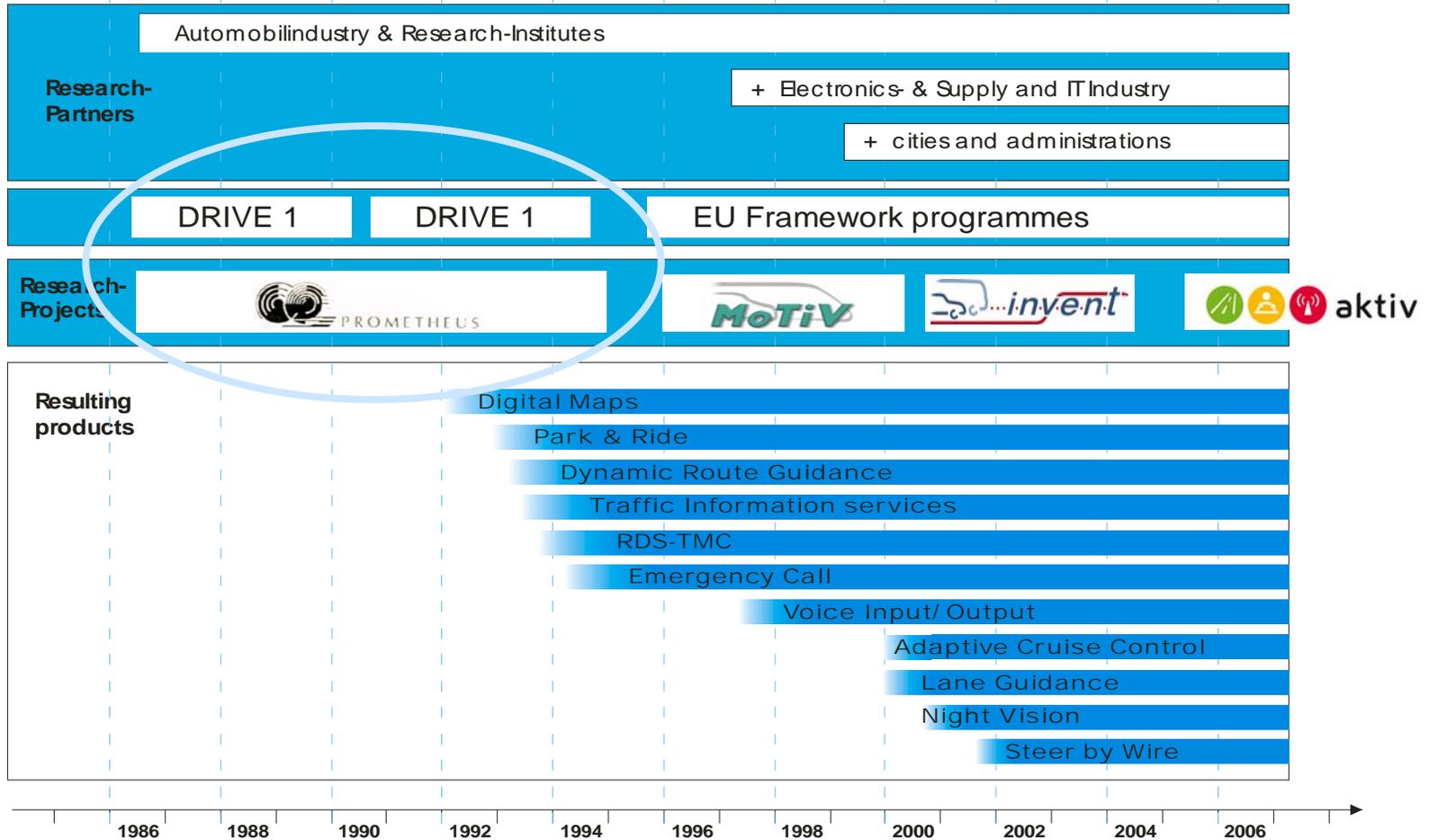
Quelle: Mercer Wertschöpfungsmodell 2015



**MMC-Study: The growth of values in the next years in the automotive industry are estimated to be in average about 2,6%. The segment electric/electronic will be at the top with about 7,2 %.**

# Continuity of cooperative research

20 years later



The Cooperative Effort is still in place

## 20 years later: 2001-2005 Prometheus Successor Project INVENT



**First Steps of the Pro-Net Concept might become reality: The Traffic Management Assistant.**

**Communication via WLAN using mobile Ad-hoc Nets between Vehicles and GPS for determining position, speed, location within the traffic/road environment to allow validation of traffic flow and traffic safety.**

## 20 years later: 2001-2005 Prometheus Successor Project INVENT



### Test- Vehicle of MAN:

77 GHz front and rear end radar, 24 GHz short distance radar, Camera Systems.  
 Sensor Fusion + Pattern recognition+ Environmental Models+ Validation +  
 Interpretation of Situations.

# 20 years later: Environmental Sensing Products and Projects

## 20 years later

Lane Departure Warning

Lane Change Assist

Blind Spot Assist

Heading Control

Parking Aid

Enhanced Lane Change Support

Heading Control

Enhanced Full Speed Range ACC  
Enhanced Park Assist  
Construction Assist

Automatic Lane Following

Lane Departure Warning

Heading Control

High Beam Assist

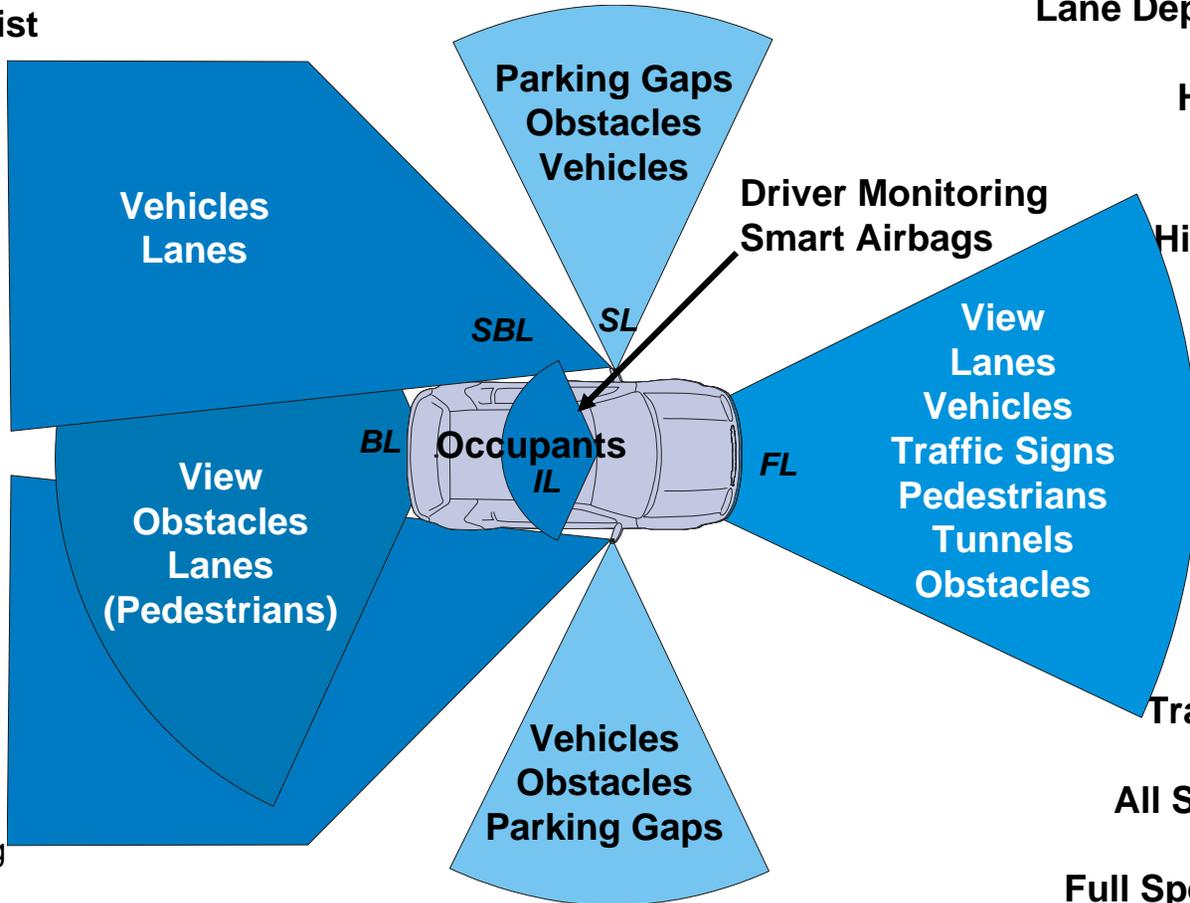
Night Vision

Traffic Sign Memory

Traffic Jam Assist

All Speed Following

Full Speed Range ACC



- FL Forward Looking
- SL Sideward Looking
- BL Backward Looking
- IL Inside Looking
- SBL Side Backward Looking

## 20 years later: Vision Enhancing Systems are in the market 2005 DaimlerChrysler Night Vision System

Licht ins Dunkel: Zwei Infrarotscheinwerfer beleuchten die Fahrbahn mit unsichtbarem Infrarot-Licht.



Ins Bild gesetzt: Eine infrarotempfindliche Kamera empfängt die Szenen und übermittelt das Bild an das Display im Kombi-Instrument.



Direkt im Blickfeld des Fahrers:  
Das Acht-Zoll-Display mit dem in Graustufen aufgelösten Infrarot-Nachtbild.



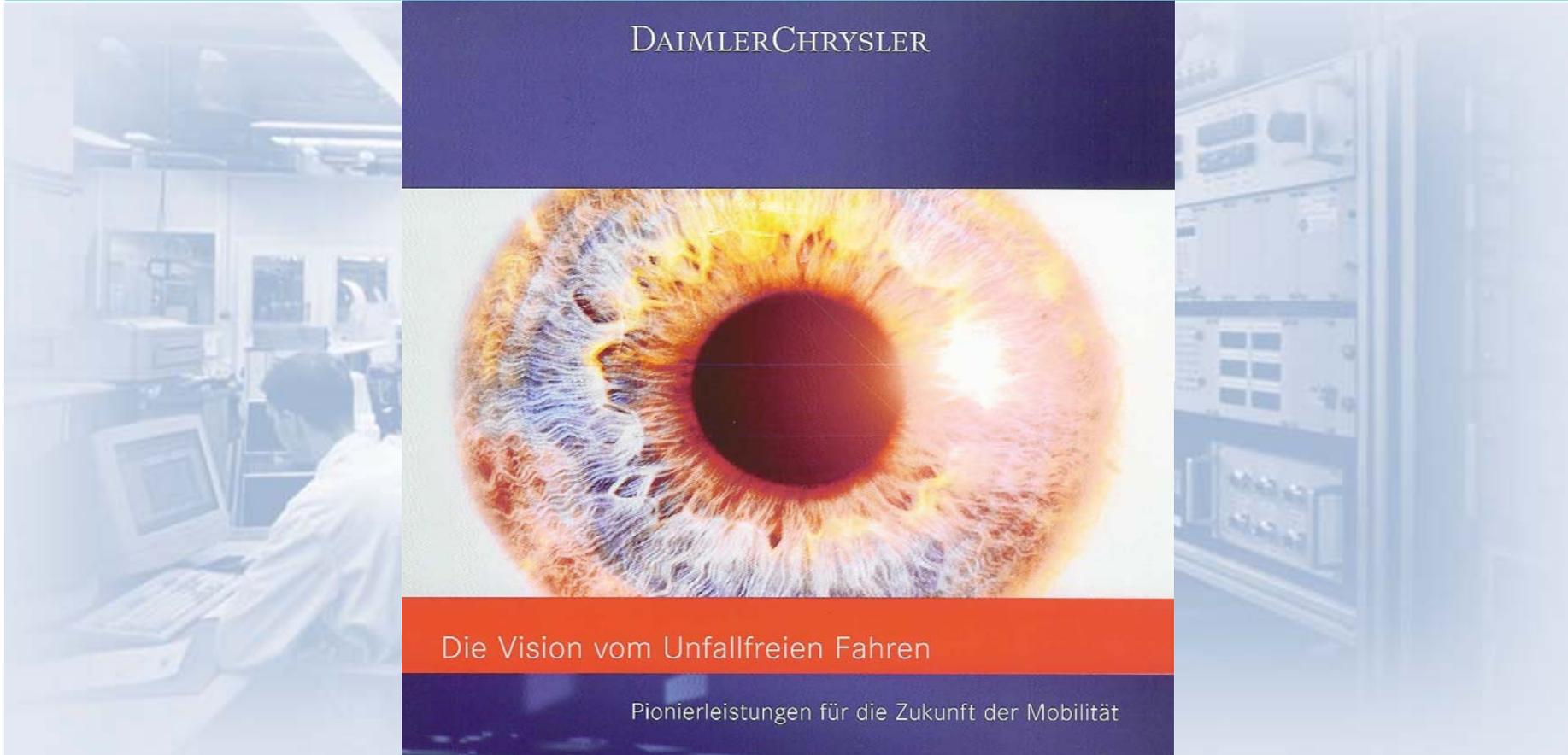
2005 Series Production of Night Vision Systems enhancing the Vision of the driver at night of up to 150 meter.

**20 years later: Feasibility of Pedestrian recognition systems in complex environmental conditions is demonstrated.**



Perception and Interpretation of very complex situations is demonstrated allowing intelligent accident avoidance strategies including pedestrian protection systems.

## 20 years later: We are coming closer towards the Vision of Accident Free Road Transportation



**DaimlerChrysler:**  
**„The Vision of Accident Free Driving is focal point of our Research Plan and is given highest strategic attention“**

**20 years later**

**The Proof of Concept**

**The Fuel Cell Story**

## 20 years later: Application and proof of “lessons learned” from the Prometheus Project

The Challenge



DAIMLERCHRYSLER

A new era of mobility on our earth

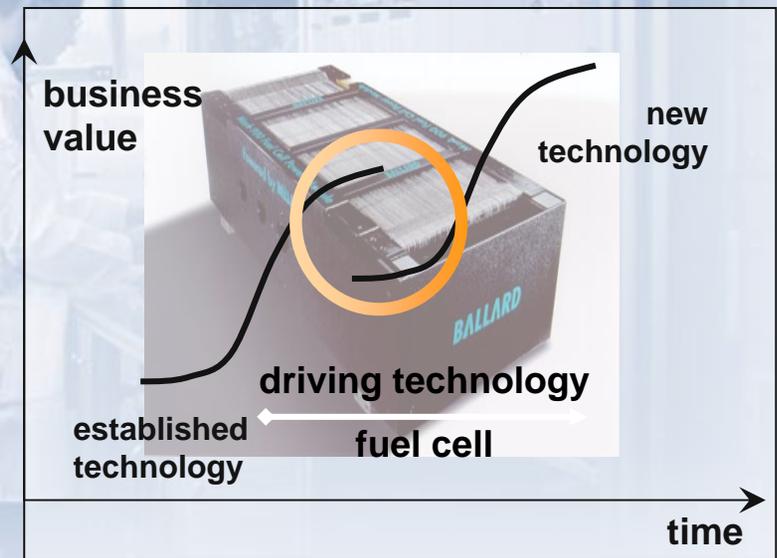
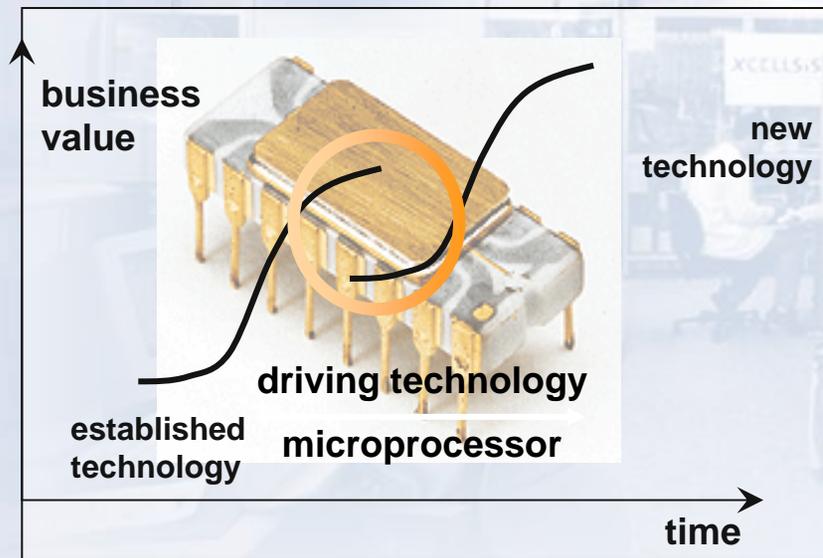
Mobility is influenced by:

- Society
- Energy supplies
- Environment
- Politics
- Competition



**There are new Challenges which require cooperative strategic approaches between industry , research entities, governments and the public and we may use the “lessons learned” from the Prometheus/Ertico etc experience to contribute to this process**

## 20 years later: The Path towards “ Sustainable Mobility “ and “Sustainable Energy Systems”



The challenge is the management of the transition process from today's established Technologies to new ones. This was successfully done in the field of Communication-, Information- and Data Processing Industry in the last Decades and a similar process has to be managed by the energy and transportation industry now. A strong candidate for the role of the Microprocessor as driving technology might be the Fuel Cell technology in the Energy- and Transportation sector.

## 20 years later: “Cooperation in Competition”

Partnerships		DAIMLERCHRYSLER			
California Fuel Cell Partnership, USA					
 <p>California is the home to a unique collaborative of auto manufacturers, energy companies, fuel cell technology companies, and government agencies. The partnership aims to achieve four main goals:</p> <ul style="list-style-type: none"> <li>▪ Demonstrate vehicle technology by operating and testing the vehicles under real-world conditions in California</li> <li>▪ Demonstrate the viability of alternative fuel infrastructure technology, including hydrogen and methanol stations</li> <li>▪ Explore the path to commercialization, from identifying potential problems to developing solutions</li> <li>▪ Increase public awareness and enhance opinion about fuel cell electric vehicles, preparing the market for commercialization</li> </ul>	<b>Project profile</b>	<b>Mobility partners</b>		<b>Infrastructure partners</b>	
	DaimlerChrysler		BP		
	General Motors		Exxon Mobil		
	Ford		Shell		
	Hyundai		Methanex		
	Honda		Chevron Texaco		
	VW		Praxair		
	Nissan		Air Products		
	Toyota				
		<b>Technology partners</b>	<b>Flanking partners</b>		
Ballard		AQMD			
UTC Fuel Cells		Air Resources Board			
		California Energy Commission			

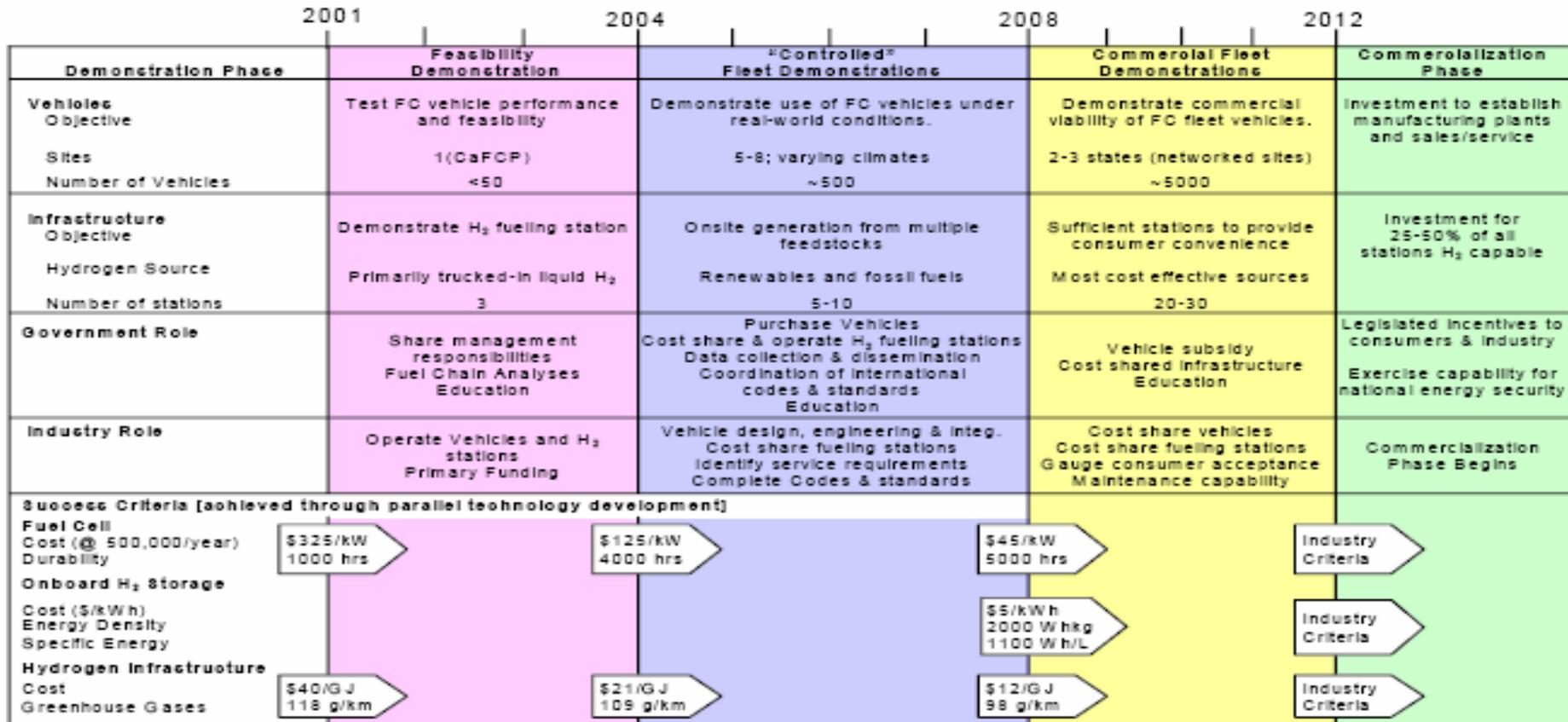
In the same way as done in the Prometheus project, the process of building up a joint effort of “Cooperation in Competition” was successfully established between key partner in the Fuel Cell area. The “California Fuel Cell Partnership” in Sacramento was founded as common platform from partner of the Automotive and Energy Industry, Technology and Research Companies and Governmental Agencies in order to promote the introduction of “Sustainable Energy and Mobility Concepts”.

**20 years later: Joining Efforts and Talents to meet the Challenges and to strengthen the business perspectives of the automotive industry.**



**Applying the Prometheus Process to build the platform for joint Fuel Cell R&D activities.**

**20 years later: This time with a plan and roadmaps, milestones, success criteria.**



**Lessons Learned: In the “California Fuel Cell Partnership” we have created a “Roadmap”, an Implementation Strategy, a Milestone Plan and a Monitoring Process in a timeframe from 2001 to 2012.**

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**Presentation of ITS Success Stories**

**Thank You For Your Attention**