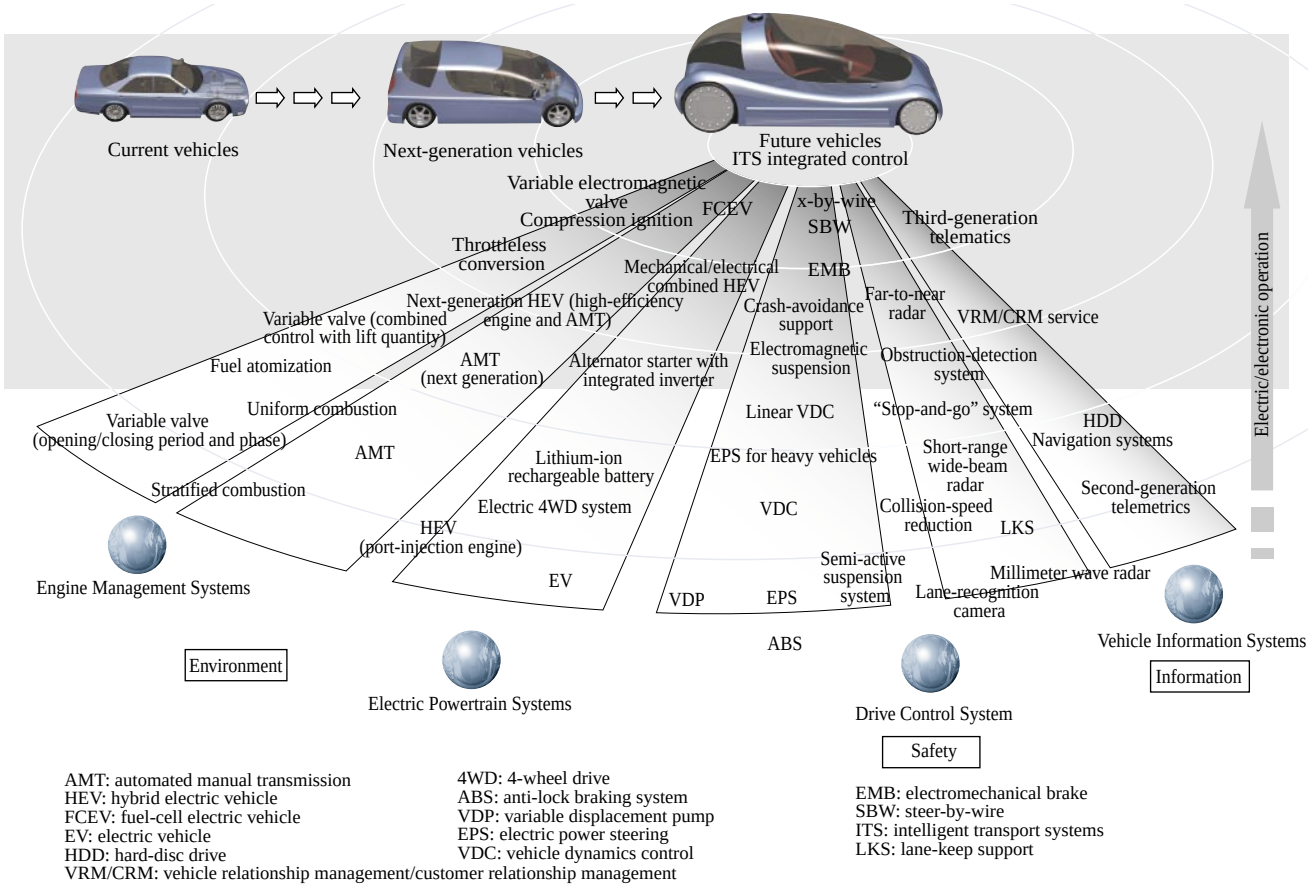
General Technology Trends and Hitachi Group's Initiatives Regarding Vehicle Electronics



AMT: automated manual transmission
HEV: hybrid electric vehicle
FCEV: fuel-cell electric vehicle
EV: electric vehicle
HDD: hard-disc drive
VRM/CRM: vehicle relationship management/customer relationship management

4WD: 4-wheel drive
ABS: anti-lock braking system
VDP: variable displacement pump
EPS: electric power steering
VDC: vehicle dynamics control

EMB: electromechanical brake
SBW: steer-by-wire
ITS: intelligent transport systems
LKS: lane-keep support

SINCE the practical application of the internal combustion engine at the beginning of the 1900s, cars have been developed hugely by human's efforts.

In 1950, the global production volume of cars was 10 million units; in 2002, however, it reached 59 million units. And from now on, according to a forecast by the OECD (Organization for Economic Cooperation and Development), the total stock of cars in the whole world will increase by 74% between 1997 and 2020, which means that the gross traveling distance will increase by 86%[1)]. At the same time, as motorization expands, problems such as global warming, atmospheric pollution, consumption of scare fossil fuels, and increase in traffic accidents will all become more obvious. Accordingly, to address these problems, improved environmental and safety performance is being sought after by those involved in the automotive industry.

In the 21st century, large-scale advances in several vehicle-related technologies are expected. They include improvements in energy efficiency by improving the powertrain (which transfers power from the internal combustion engine to the motor drive); realization of zero-emissions and extremely low fuel consumption; evolution from protecting the safety of passengers during collisions (i.e. passive safety) to preventative safety measures (i.e. active safety); and improvements in convenience by developments of in-vehicle IT. Moreover, it is anticipated that these advanced technologies will lead to more sophisticated ITS integrated control systems.

As the evolution towards electrical and electronic control of cars continues, Hitachi Group — adopting realization of ITS integrated control as our long-term theme — is placing major emphasis on four technical developments concerning system tasks in three segments. In the environment segment, the first two developments — Engine Management Systems and Electric Powertrain Systems — will contribute to environmental protection and effective energy utilization; in the safety segment, the third — Drive Control Systems — will achieve fine control by

applying “by-wire” technology and sensor technology that uses electronic and electrical systems in place of mechanical systems; and in the information segment, the fourth — Vehicle Information Systems — will improve convenience by making full use of high-speed communication and large volumes of data.

By applying our wealth of experience as a “system integrator” of each of these specific systems and our technical capabilities as an integrated electrical appliance manufacturer, we are striving toward faster development of even higher quality systems. And we believe these efforts will lead towards realization of our vision: the pursuit of high safety and amenity while achieving coexistence with the global environment.

Hitachi Group is aiming at realizing people’s dreams while creating new value between people, vehicles, and society. In this special feature, Hitachi Group’s initiatives — including our development ideas and research directions — regarding our latest technologies and products in the automotive field are introduced.

REFERENCE

(1) Japan Automobile Manufacturers Association, Inc., JAMA Report No. 94, (Feb. 2003).