The Intelligent Transport Systems and Telematics (ITS&T) Applied Research Group (ARG) has been established in the Faculty of Engineering and Computing (Department of Mechanical and Automotive Engineering, Coventry University) in order to work on practical tasks related to advanced automotive systems, including Controller Area Network (CAN-bus), vehicle diagnostics and safety, vehicle telemetry (sensors monitoring) and vehicle position monitoring (based on GPS, an accelerometer and gyroscope), wireless data-transmission and GPRS network, and tasks related to Intelligent Transport Systems. In particular, modelling and simulation of road traffic networks for optimization of the traffic flow, traffic accidents simulation, reduction of fuel consumption and exhaust emissions. Other projects, related to Intelligent Transport Systems, include modelling and simulation of signalized and non-signalized roundabouts for optimal traffic control; design and simulation of the optimal allocation of traffic infrastructure, charging stations for electric vehicles in car parks and on the roads. More recently, the following projects have been carried out: emergency evacuation of pedestrians and vehicles in the city and from car-parks due to environmental disasters and related threats, logistics of multi-modal transportation, driver’s health and performance monitoring via the internet using wireless sensors, and simulation of hybrid-electric and fully-electric vehicles in different traffic and environmental conditions. At the present time the ITS&T group is interested in the development, building and testing of autonomous vehicles: unmanned ground vehicles (UGV), unmanned air vehicles (UAV) and maritime autonomous vehicles (MAV). The group is actively engaged in the work on European Union projects (remote control of equipment and robots via the Internet, VAPVoS; Dynamics In and Of Complex Systems, DIONICOS), and on specific research and consultancy projects with industrial organizations.
An **automotive telemetry** system has been designed in order to monitor parameters of a car and driver performance during the racing competition.

The telemetry allows one to monitor car position on a road using **GPS** (Global Positioning System) via satellites.

An **Inertial Navigation System (INS)** based on an accelerometer and solid-state gyroscope is used in order to improve the performance of car navigation.

The telemetry allows **monitoring medical conditions of a driver** (heart-bit rate, body temperature and blood pressure) in the real-time via the Internet.
Intelligent Transport Systems

The following sensors are connected to the telemetry system:

- 4 linear potentiometers to measure suspension movement;
- 4 thermocouples to measure the exhaust temperature of each cylinder;
- 3 rotary potentiometers to measure steering wheel-, brake pedal and throttle position.

Controller Area Network (CAN-bus) has been designed for the car in order to reduce the number of wires and overall weight, and to improve the reliability of the data acquisition system.
Intelligent Transport Systems

Road User Behaviour Scenario

Aim:
To investigate the potential factors that affect traffic safety on the road traffic / pedestrians situations.

Overview
As the world’s population grows, traffic safety is becoming a mounting challenge for many cities and towns across the world.

Million of Road Crashes

Estimated UK Road Traffic Volumes

Traffic congestion/crash increases

Virtual test driving of vehicles:
- Simulation Behavior is like a real-live test;
- Modification of car parameters (engine, tyres, etc.);
- Design of road, traffic, a virtual driver and pedestrians.

Study Objective
To research and evaluate the potential failure of traffic accidents based on the main factors that affect traffic safety on the road/highway situations.

To use an advanced 3D tool packages to create the real time situations and analyze the best solution in order to reduce road accidents such as crash.

Specific Traffic Safety System benefits include:
- Better safety;
- A positive economic impact by decreasing traffic accident;
- Reduction of numbers of serious injuries and traffic fatal or critical accidents.
Skills and Expertise Offered

- Modelling and simulation of intelligent transport systems
- Optimization of vehicles flow in road transport networks
- Transport Logistics
- Design of vehicle automatic control systems
- Automotive electronics
- Wireless Sensor Networks (WSN)
- Design of driver fatigue monitoring using electronic devices
- Driver performance monitoring and testing on a driving simulator
- Autonomous cars
- Traffic safety
Looking to partner in:

- Technology transfer in the area of Transport (Road, Railway, Maritime and Aeronautics) and other areas;
- Implementing innovative and green urban transport solutions in Europe and beyond;
- Encouraging modal shift and decongesting transport corridors;
- Managing integrated multimodal urban transport network;
- Other areas of mutual interests...