Smart Cities – the Smart Sustainable Districts Programme on 17-3-2017

Dr Mazur explained that the Smart Sustainable Districts Programme (SSD) looked into service networks, the flow of resources, land use, etc; local teams are set up to deal with any pressing topic. Cities have most to gain from smart initiatives, and have the money to introduce them. The aim is that they should be acceptable to the populace, sustainable and environmentally clean.

Air pollution and transport is the topic of concern that Dr Mazur went on to discuss. Several European cities stop traffic when air pollution is bad – London, not just in the centre but Greenwich too, merely recommends staying indoors. Oxford Street is notorious for its levels of pollution, but the Cromwell Road is worse.

Several design approaches can be taken: with traditional vehicles, lightweight materials reduce fuel usage - improvements to petrol/diesel engines can reduce pollution. Electric propulsion is better still, whether all electric, hybrid or using hydrogen fuel cells. Electric vehicles come with regenerative braking, recharging their batteries when slowing for traffic lights or going downhill. The environmental impact of driving electric vehicles is 5% of traditional vehicles. In France electricity supply is Nuclear – and carbon free. Germany is 50% carbon free; and the UK 10%, but rising.

Driverless cars coping with the whims of drivers of conventional cars is a serious problem, with much work going into bringing it within acceptable bounds. However, we have self-parking cars, cars which waken dozing drivers, or apply the brakes if too close to the car in front, etc. The technology has evolved from safety practices used in aircraft, ship, and space satellites; and is now cheap enough for use in cars – the Google car is based on the Mars Rover (a UK design).

The range of available kit is impressive: *cameras* see contrast differently – often better, if not in snow; *radar*, *lidar* (3D optical), and *ultrasound*. This is miniaturised, with multiple units disposed around the vehicle, giving views other than that of a single driver.

Vehicle-to-Vehicle and Vehicle-to-Infrastructure (V2V, V2I) communication (when equipped) is in the offing. The "I" could give automatic speed limit control, road work information etc. The second Vehicle could indicate its presence while still out of sight round a corner. But all this is open to hacking, or equipment failure. Ethics come into it - who do you sue after an accident if there is no driver?

Inefficiency – the average car is not used for 96% of the time, 2.6% being driven, the remainder parked or in traffic jams. Car pools improve usage. Motorbikes use less fuel; bicycles none. Speed bumps are a poor method of traffic calming, and another cause of inefficiency and pollution – they are (sometimes) designed not to be too uncomfortable at 20 mph, and to indicate that speed limit; but drivers do not realise this and often approach them at 30 mph, brake (producing brake dust) and accelerate away (CO_2, NO_2).

Shared delivery vans and taxis (Uber) reduce vehicle mileage and congestion. Busses can be rerouted to suit the conditions. TfL have ambitious plans for decarbonisation of all such vehicles, and the installation of many more electricity recharging points.

Other methods of traffic calming which are more congenial and environmentally friendly, particularly in side streets, include tree and shrub & planting, distinctive road surfacing, and less infrastructure (eg, kerbs, street signs). Other smart improvements should reduce the duration of road works - knowing where to dig before starting – and collaboration between services. The number of crashes should be reduced. Travel time should become more dependable.

Dr Mazur closed by saying that new models for the (shared) ownership of cars will come, and new business models, for instance for delivery.