Revolution Very Light Rail Vehicle project is developing a lighter, lower-cost, passenger friendly solution for linking heavy rail stations, airports and other hubs in the transport network to rural and suburban areas, in the first instance using segregated alignments to avoid inter operability issues with conventional rail.

The first phase of this project is now complete. It involved the design and test of a self-propelled diesel-electric hybrid boogie and a concept design of a very light weight vehicle body structure.

The consortium, led by TDI and including WMG, Unipart Rail and Prose, has recently received a £3m grant from DfT for Phase 2 of the project, which will deliver a full size demonstrator vehicle by June 2019.

WMG has also been commissioned by Coventry City Council to develop a battery powered, low floor, very lightweight shuttle vehicle and low-cost slab track: this project will deliver a demonstrator vehicle and associated track solution in mid 2019.

**Benefits**

Very Light Rail has many potential advantages over traditional rail, metro and tram solutions, including low axle weights allowing the use of less substantial track infrastructure, self-propelled vehicles with energy storage and recovery systems which remove the need for overhead electrification, reduced capital cost for vehicles and track, as well as reduced operational and maintenance costs.

The Revolution vehicle is being designed to minimize manufacturing costs and so will be priced below traditional light rail solutions such as trams, and will operate fully-electrically within stations, reducing pollution and noise. The Coventry Shuttle vehicle will offer similar benefits for on-road applications.

**Challenges**

Reduce cost and mass. DfT and RSSB set the challenge of significantly reducing vehicle mass and using proven technology from the automotive sector to accelerate innovation and drive down costs. This requires a focus on both the vehicle and the track infrastructure on which the vehicle will run.

Standards and rail culture. Pushing for radical change in the very conservative rail sector, including challenging current rail standards and operation procedures has been a significant challenge, and there is much work still to be done in this respect.

By virtue of the light weight vehicle construction, the Revolution railcar will not meet current mainline rail crashworthiness and safety standards – this is an issue for Train Operating Companies who are keen to use new vehicle solutions to help drive down operating costs.

**Lessons Learned**

Reduce cost and mass. The main strategy to reduce costs has been to employ vehicle manufacturing approaches as well as using proven technology from the automotive sector including multi-material body structures, power-train components, Ethernet based vehicle wiring, and the like. The aggressive reduction in vehicle mass (the Revolution vehicle will be 50% lighter than current main line rail cars) is allowing the design of novel slab track solutions which will avoid the need to remove utility services from beneath roads, thereby cutting civil engineering construction costs.

Standards and rail culture. The consortium is working with RSSB to identify how current railway vehicle standards might be relaxed to allow very light weight vehicles to operate alongside traditional ‘heavy’ rail vehicles on certain parts of the main rail network – this will remove barriers to widespread commercial operation.