



2020 Feasibility Study Competition Winners:

Commercial and Specialist Converter EV Skateboard (CaSCES)

JSC AUTOMOTIVE LIMITED

The CaSCES feasibility study will investigate a novel lightweight, multi-material, zero emission platform concept for the emerging electric last mile, light commercial and courier sectors.

The platform will utilise proprietary battery/drivetrain components to deliver OEM levels of performance, reliability and durability, overseen by management and control systems from UK technology providers delivering ISO26262 capability, innovatively packaged in a lightweight JSCA structure to maximise commercial payload.

The proposed zero-emission platform will provide a cost-effective route for low-volume commercial vehicle manufacturers and specialist vehicle converters to electrify their products while delivering bespoke tailored vehicles to fulfil specific customer and fleet user requirements.

RIFT Next Generation Motor (RIFT NGM)

RIFT TECHNOLOGY LIMITED

Building on our existing development projects for 10kW and 64kW EV drives (RIFT-10 and RIFT-64), we introduce an advancement to radial electric motor design that yields a number of advantages for our electric machine designs – particularly enabling UK motor production growth and thus reshoring manufacturing from low-cost countries.

The RIFT Next Generation Motor (RIFT-NGM) concept replaces traditional windings in small, low power motors and replaces them with an innovative alternative solution that creates the benefits of significant materials saving -particularly copper- as well as eliminating the requirement of costly winding machines resulting in significant weight and cost advantages.

The IXS – a Compact, Integrated Motor Controller and Motor for Electric Motorcycles

EDGE MOBILITY LTD

The goal of this Niche Vehicle Network Feasibility Study is to explore the potential for developing a low-cost, safe, compact, and rugged motor controller optimised for electric motorcycles that can be readily integrated and packaged with Edge Mobility's existing radial flux motor.

HyLo - Hybridisation for Low Volume

ARIEL LTD

The low volume sector is dominated by high performance ICE vehicles with little application of zero or low emission technologies. With knowledge from other R&D projects Ariel recognise that at present a move to full zero emission powertrains for nearly all of the low volume sector is not feasible.

Hybrid systems should provide a viable route towards zero emission drivetrains, however there are currently no production hybrid vehicles in the low volume niche sector. This study aims to fully assess the feasibility of various hybrid solutions and determine which is most suitable to take forward for application in niche vehicles.

Ultra-High Efficiency, High Energy Density Motor for Electric Vehicles

INVIZIO LIMITED

This totally novel motor operates across a wide range of speeds but maintains a very high efficiency at all times. Most EV motors only spend a small proportion of their duty cycle operating at maximum efficiency, and a large proportion creating waste heat.

This project evaluates a concept for an ultra-high efficiency motor that delivers high torque and high speed within the same envelope as a standard motor. In addition, no cooling is required. The benefits to EV's are profound - smaller battery packs or longer range. This allows EV's to be cheaper or have better performance.

WSTM With E-Shift Technology Exploration

SWINDON POWERTRAIN LIMITED

The Feasibility Study objective will be to define the design of a new generation of traction motor, which will negate the need for a gearbox to be coupled to the motor's output shaft.

The electromagnetic analysis will be conducted using proprietary software dedicated to electric motor design, performance simulation & analysis.

Fulfilling the objective will result in a vastly simplified and significantly reduced EV powertrain system BOM cost in addition to smaller powertrain packaging envelopes.

The proposed technology means that the motor's windings would be altered to suit the specific application requirement, as opposed to designing and manufacturing new gears.

H.I.T.S Hybrid Integrated Technology Structures

SIMPACT ENGINEERING LIMITED

Composites are great for high strength/weight applications where aesthetics are important. Steel is isotropic, brilliant used in the right place and well known for its durability.

The idea is to combine the best of both-Reynolds high strength steel & Simpack superior carbon-fibre composites-to create a hybrid technology that is integrated in an advanced structure. A thin metal ALM layer which will become part of the product is used as tooling surface for high pressure composites consolidation. The result is a remarkably strong and lightweight hybrid multi-functional component.

If proved feasible, we will manufacture a Small Scale Demonstrator (SSD) for exploitation.

Heat Battery Heat Pump Integration

SUNAMP LIMITED

Our vision is to integrate our own developed heat pump with high temperature phase change material thermal store (heat batteries) giving a module that improves electric vehicle efficiency and gives range consistency across all seasons.

These modules can be scaled for different use cases such as light duty cars and vans, trucks and buses. Our heat batteries provide the heat pump thermal load enabling operation in extreme low temperatures.

By developing our own heat pump, the system is optimised to significantly improve overall system efficiency. This reduces energy demand on the vehicle HV battery extending range and reducing range anxiety.

Project IFICAS (Integrated Functionality In Lightweight Composite Automotive Structures)

CARBON THREESIXTY LIMITED

IFICAS will enable multi-functionality in lightweight composite structures. Utilising Tailored Fibre Placement (TFP) the project will demonstrate the feasibility of including elements - such as conductive wires - into composite structures and panels. The ability to design integrated functionality into these components will lead to significant simplification of wiring harnesses, additional light-weighting and pave the way for other features such as structural health monitoring, sensing, heating and lighting.

The approach proposed will lead to advances in the technology required to automate the placement of these elements/materials into composite structures and how to design such systems and structures.

Highstrength-Hybrid-Hydroforming (HHH)

PAB COVENTRY LIMITED

Achieving the lightest and strongest vehicle body through a technological approach that is also commercially viable and advantageous is a fundamental challenge. PAB Coventry Ltd, a leading supplier to all main UK heritage brands of vehicles, have teamed up with Advanced Forming

Research Centre, the leading metal forming experts in the UK, to pioneer an approach based on hydroforming of tailored blanks.

The project will harness advanced metal forming modelling techniques to test feasibility of a hybrid approach combining hydroforming and tailored blanks to create an ultra-lightweight component for an iconic, but affordable, super-light niche vehicle of the future.

ICOMS (Integrated Control, Operating and Management Systems)

MORRIS COMMERCIAL LTD

ICOMS will investigate combining powertrain, body control and battery management systems for zero emission vehicles to simplify integration and architecture complexity, reducing development and calibration time and costs.

Functional safety requirements will be considered along with the hardware and software suite necessary to provide a fully functioning, easily integrated multi-systems controller with a straightforward user interface and application layer calibration tool set.

ICOMS sets out to provide a foundation for a systems platform which can be applied to a wide range of niche EVs, significantly reducing the associated design, integration, calibration, test and validation requirements facilitating accelerated niche OEM electrification.

Piper EV Super Sprite

PIPER SPECIAL VEHICLES LIMITED

This project directly supports the competition technology themes; Lightweight vehicle body, chassis and powertrain structures and Alternative propulsion.

Piper recently acquired total IP rights, all tooling and moulds, to manufacture accurate replicas of the iconic Austin Healey 'Frogeye' Sprite. The car was previously produced by the Frogeye Car Company, on the Isle of Wight, under guidance from Geoff Healey with fibreglass body, BMC petrol engine, and galvanised steel tubular chassis. Piper will completely re-engineer the car whilst keeping its iconic exterior styling creating an EV classic British sports car. Piper will build prototypes in house leading onto low volume manufacturing.

NEAT Chassis - Novel Electrically Assisted Trailer Chassis

STALCOM AUTOMOTIVE TECHNOLOGIES LIMITED

An examination of the feasibility of a powered trailer chassis concept with on-board ev drivetrain and control systems that would allow heavier loads to be "pulled", or rather "controlled" by lighter, low and zero emissions vehicles. The proposed lightweight trailer chassis with integrated electric drive, regenerative braking, and advanced stability control could remove the requirement for a heavy inefficient tow-car and it is anticipated that there will be a number of other significant customer and environmental benefits from adopting this disruptive approach.

Fast Charge Container Movers

WESTFIELD TECHNOLOGY GROUP LIMITED

Westfield lead a team consisting of Cranfield University and the National Graphene Institute (University of Manchester) to assess the feasibility of port movement vehicles being made electric and incorporating a carbon-ion fast charge system to allow them to be charged from flat to full while they being loaded/unloaded. The feasibility study is to focus on use cases from the Port of Southampton and the Port of Antwerp (Europe's second largest seaport) which moves container cargo around the site 24 hours/day.

A letter of support has been provided by the Port of Antwerp and the Operators at the Port.

Cool Runnings: Efficient Operation of Refrigeration Units in Zero-Emission Powertrains

ARCOLA ENERGY LIMITED

Refrigerated logistics is a significant sector of the heavy duty vehicle market and with frequent urban use is a key target for zero emissions operation. High energy demands for refrigeration mean that refrigerated logistics is a strong candidate for fuel cell electric technology.

This feasibility study will develop a concept design for efficient integration of refrigeration into a zero emission powertrain, design control strategies for optimisation of refrigeration as part of a powertrain system, and develop the commercial case and route to market for a refrigerated zero-emission truck product development.