

## 2017 Team Achievement Award

### *New Flyer New Product Development Team*



The 60ft battery electric bus with a fuel cell range extender was designed, built, and tested by the New Product Development Team at New Flyer, which includes 14 professional engineers and engineering interns.

A first of its kind project in the world for transit buses, this 60ft articulating bus incorporates a centre driven axle and a completely stainless steel frame. The uniqueness of this project is the use of a fuel cell as an on-board battery charger or range extender to manage overall vehicle energy demands and designating the batteries as the only source for power and short/medium term energy such as a hill climb or a short high speed run. The centre driven axle allows two axles to provide forward power when needed and doubling of the regenerative braking potential. New Flyer's innovative approach is also in efficiency and reliability improvements by using simple and robust batteries for micro-cycling loads and operating the highly complex fuel cell in a more steady state mode.

The major advantage that the addition of a fuel cell extender to an electric bus provides is the increase in range from 120 miles to over 300+ miles, and that it is not limited to routes that have charging stations at key locations. This range is very comparable to diesel buses.

The team spent a lot of time designing and integrating various new systems some of which include fuel cell range extender, interior battery compartment, battery management system, 60ft stainless steel frame, centre driven axle, hydrogen fueling station, and fuel transportation trailers. A number of prototype assemblies were build and changes were made based on manufacturability. Commissioning and testing was performed and finally the bus has been delivered to a test track facility in Altoona, where it is undergoing structural durability tests which will qualify the bus for customers. Safety was also a major factor that was taken into consideration when designing the hydrogen fuel storage and distribution system as well as the interior battery compartment.

This project has the potential of having a profound effect on the environment. The bus is a direct replacement for diesel and compressed natural gas (CNG) buses and therefore can reduce greenhouse gases from their fleets. This development is significant as it shows that a fully zero emissions transit bus not only requires very little compromise, but in some cases actually outperforms conventional technologies, which has been a major barrier for adoption of zero emissions vehicles.

In recognition of the engineering excellence demonstrated in their innovative design and implementation of this outstanding project for the future of transit buses, Engineers Geoscientists Manitoba is pleased to present the Team Achievement Award to New Flyer's New Product Development Team.