

Georgia Bus Project



project overview

Project Objective

The objective of this project is to design, manufacture and test a low-speed industrial motor system in a heavyduty, 34-foot Blue Bird bus owned and operated by Georgia Power.

Team Members

- Electric Transit Vehicle Institute (ETVI)
- Georgia Power Company
- SAFT America, Inc.
- Blue Bird Body Company
- National Energy Electrical Testing, Research & Applications Center
- SK International
- Center for Transportation and the Environment (CTE)



Most, if not all, electric and hybrid-electric propulsion systems in heavy-duty vehicles in the United States have used high-speed electric motors. Heat generated by these motors has long been a problem. In addition, vehicles using high-speed motors require some type of mechanical gear reducers to increase torque to launch the vehicle from a stop. This limits the speed of the vehicle and requires the use of specialty components. A low-speed motor, in contrast, can be used with standard heavy-duty vehicle components (standard drive axles), functions well at low speeds and allows the vehicle to accelerate to highway speeds. Better yet, low speed electric motors generate less heat. The low-speed electric motor has another attractive feature; it is an off-the-shelf component produced in high volume for commercial industries. Therefore, they cost much less than specialty built high-speed motors and can be readily replaced when needed.

In addition, the propulsion system used in the Blue Bird project bus gives the driver the flexibility to choose the operating mode of the bus. The bus can be operated in the pure electric mode in congested areas or in areas where noise could be a problem. The driver can also choose to operate the bus in a low-emission mode when additional power is required, and still reduce emissions and noise. When maximum power and long sustained travel are required, the driver can use the full hybrid mode. The driver can choose each of the three operating modes simply by moving a switch located within his or her reach. This greatly increases the versatility of the bus in different operating environments.

Project Overview cont'd

Along with the integrated SKI propulsion system, the bus uses Saft nickel cadmium (NiCad) batteries. The robust discharge characteristics of NiCad batteries greatly enhance the operation of the bus, so fewer batteries are required. The batteries are thermally managed with forced air, and electrically managed with the management system developed by SKI. Using the Saft NiCad batteries with the SKI battery management system should allow the bus to run for many years with few battery problems.

Project Results

The Blue Bird project bus completed testing at the Electric Vehicle Test Facility in Chattanooga, Tennessee. The bus performed exceptionally. It achieved greater than 30 mile range in all electric mode and more than 150 mile range in Hybrid mode. The hybrid system is expected to reduce emissions by over 50 percent while more than doubling the fuel economy of this 29,000 pound vehicle.

The bus was demonstrated in Sevier County Tennessee in late June 2002. It was then driven from Chattanooga to Atlanta, Georgia to be used in Georgia Power's electric shuttle. During this trip the bus got an astonishing 17.5 miles per gallon.

Next Steps

After it has been demonstrated in the Georgia Power Employee Shuttle, the bus will travel to other prospective transit and shuttle users. Since its operating characteristics are so versatile, the bus can be used in different transit duty cycle routes without having any alteration to its hardware or software. A schedule of demonstration sites is being developed, so that the bus can be used by as many prospective operators as possible, demonstrating that hybrid-electric vehicles are certainly reliable in everyday transit and shuttle use.

In addition, SKI is developing a business plan to commercialize and market its unique propulsion system, bringing a new technological advancement to the hybrid-electric bus industry.

