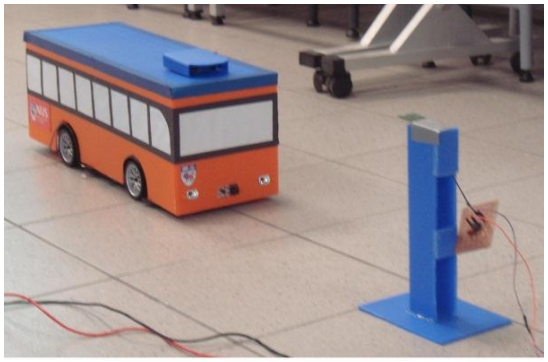
**EE2001 Project Final Report**
**Auto-driven School Shuttle Bus**


In this project, a prototype of an auto-driven school shuttle bus is designed for the newly built NUS University Town. An intelligent traffic system is expected in the UTown. The auto-driven school bus will improve the performance of traffic management and increase the efficiency of traffic control. Rather than plenty of tapes or markers sticking on the ground, only Navigation Guiding Towers and RFID cards are required at intersections or turning points for this auto-driven shuttle bus. Besides, a feedback system is implemented the Control Station to monitor the shuttle bus.

## Subsystem 1 - IR Navigation System

The Navigation Guide Tower with an IR transmitter gives the forward direction to the bus, on which there are three IR receivers. IR receivers on the top of the bus are able to adjust their direction automatically to look for the IR signal emitted by the Navigation Guide Tower. Signals received by the bus are decoded, amplified and analyzed to seek for the correct forward direction.



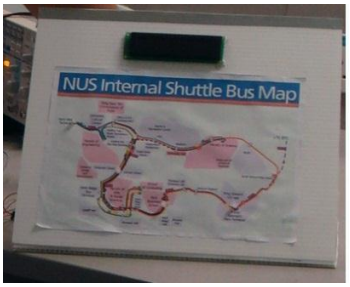
**Subsystem 2- Obstacle Detection System**


The ultrasonic model in front of the bus will continuously check whether there is any obstacle in front of the bus. If the obstacle is within the pre-defined range, which is 15cm, the bus will stop and the buzzer on the bus will be turned on to inform the obstacle. After a few seconds, if the obstacle is still there, the shuttle bus will bypass the obstacle automatically.

**Subsystem 3 - RFID Command System**

The school bus will make turns automatically along the pre-defined routine. At each intersection turning point and bus stop, one RFID card is placed on the ground. When passing by the RFID card, the RFID card reader on the bus will read the card number and inform the bus to take actions accordingly. When the bus is making turns, the corresponding turning light of the bus will be on; when the bus is stopped, the stopping light will be on; when the bus arrives at a bus stop, the door will be opened, and be closed automatically if there is nobody getting on/off the bus.

**Subsystem 4 - Feedback System**




The feedback system is designed for the Control Station to monitor the bus. The current state of the bus is sent back and displayed on the LCD. For bus stops which the bus has not reached, the LED representing this bus stop will be in green; otherwise, the LED will be in red.