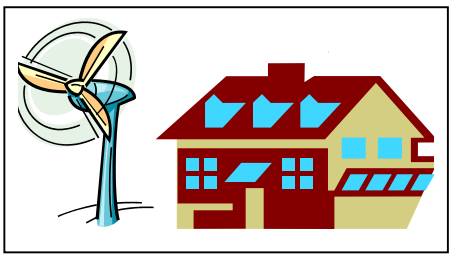
1234 Research Parkway
Technology, MI 98765
"State-of-the-Art Power"

M E M O R A N D U M

WHIRLWIND CORPORATION

TO: *WindDrive* ™ Development Group
FROM: C. Radcliffe, Controls Group Supervisor
DATE: January 25, 2010
SUBJ: Modeling and Experimental validation of the *WindDrive* ™ transmission and clutch control system.

1. This week the group will model the *WindDrive* ™ transmission as well as analyzes the response give specific input. The system specifically simulates the dynamics of a transmission shaft attached between a load and the rotating airfoils of the *WindDrive* ™ blades at the top of the tower. The servo motor represents the drive torque to the transmission shaft while the fixed end represents the load at the base of the tower. We anticipate that the successful modeling of torsional stiffness will play a crucial role in the success of our system design effort.



2. You will operate a prototype torsional mass-spring-damper system, to test the capability and properties of this technology. You will calibrate system parameters and measure the physical characteristics governing the torsional MSD.

3. This laboratory evaluation of the Torsional MSD will help you determine its applicability to our new *WindDrive* ™. The demonstration is designed to simulate applications to the transmission clutch control system; however, we feel there may be application to a new wind vane angle control system as well. You will come to quantitative conclusions on the performance and system errors through investigation of this dynamic system and the control strategies as well as sources of error in the modeling and measurement.