MEDIA RELEASE: Death Defying Diwheel Defies Gravity

Students and researchers in the School of Mechanical Engineering at the University of Adelaide have developed a novel vehicle called a diwheel (seen below) that allows a driver to travel in a conventional upright position and, for the more adventurous, in an upside down position. The diwheel consists of two large coaxial wheels that completely encompass an inner frame containing a driver. The inner frame is suspended within the wheels in such a way as to allow the inner frame to rotate freely.

The University of Adelaide diwheel, affectionately known as EDWARD (short for Electric Diwheel With Active Rotation Damping), employs the latest drive-by-wire technology (used in modern aircraft) and control theory to aid the driver in piloting the vehicle. Such technology prevents the inner frame from rotating (sloshing back and forth) during operation, an inherent property that has limited the drivability of previous diwheels. And for the thrill seeker, the unique dynamics of the vehicle can be exploited to invert the inner frame, so it is possible for the diwheel to be driven while the driver is upside down as shown below.
“EDWARD not only rocks (literally) but it’s green too. It’s fully electric, and employs regenerative braking, so energy is recovered when slowing down,” said Jack Parsons (shown above), a student on the project.

Associate Professor Ben Cazzolato said “We often get asked why build it? Why build a roller coaster? ‘Cause it’s fun! Apart from the incredible exhilaration of driving EDWARD, there are some serious pedagogical reasons to build such a device. It teaches engineering students about modern system design and control techniques – the very methods they will use when working as graduate engineers.”

The future? The driver can be orientated in any direction, and held in by a racing seat and harness, allows for intense accelerations of several G’s. For the first time a complete mathematical model of a diwheel has been derived, which will enable extreme manoeuvres and tricks to be performed at the press of a button. These tricks are to be coded in software by future students.

EDWARD will be one of 63 exciting exhibits on display to the public at the 2010 University of Adelaide Mechanical Engineering Exhibition to be held at the Goyder Pavilion, Adelaide Showgrounds on Tuesday and Wednesday 26th-27th October. Along with the diwheel display, detailed information and demonstrations of slosh and inversion control will be on display.

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