

## Maglev generator bodes well for wind power

Engineers at June's Wind Power Asia Exhibition 2006 in Beijing showed off what they are claiming is a significant advance in wind power efficiency: the world's first full-permanent magnetic levitation (Maglev) wind power generator.

Jointly developed by Guangzhou Energy Research Institute under China's Academy of Sciences and by Guangzhou Zhongke Hengyuan Energy Science & Technology Co., Ltd., the generator's big bonus is that mechanical load

stress is dramatically reduced. It can therefore operate in very low winds – at starting speeds of 1.5 metres per second, and cut-in speeds of 3 metres per second.

This not only means a significant increase in operational hours; the technology's inventors believe a 20 per cent improvement in generating capacity can also be achieved, and potentially a halving of operational expenses compared to current wind generators.

The Maglev turbine's low-



Wind turbines deliver much needed power from China's northwestern desert. Linda Wang

wind operation offers some advance for the millions of rural homes in China that lack access to electricity.

Xinhua News in China also

reported that the generator could provide roadside lighting along highways by utilising the airflow generated from passing vehicles.

## Maths expertise will underpin national greenhouse maps

Mathematical research is going to help create detailed land use maps that will enable Australia to estimate and better manage its greenhouse gas emissions.

The Australian Greenhouse Office (AGO) and CSIRO's Mathematical and Information Sciences Division (CMIS) recently signed a three-year, \$2.5 million contract to develop the mapping program under an ongoing research partnership. The relationship has already led to big advances in understanding historical nationwide patterns of land use changes.

The AGO estimates that around 30 per cent of Australia's human-induced greenhouse gas emissions come from activities like cropping, grazing, land clearing and forestry. This makes it important to map the extent and changes of different forms of land use. Such maps are an input to the AGO's National Carbon Accounting System, which operates one of the largest satellite monitoring programs in the world.

CMIS Chief, Murray Cameron, says the agreement extends a collaboration with an impressive track record. Since 1999, CMIS's Mathematics for Mapping and Monitoring group has worked with the AGO on its Land-cover Change Project that has produced maps that track land use

change since 1972 to within 25 metres over the entire continent.

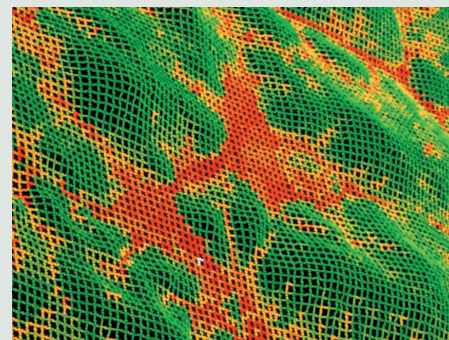
Using satellite images, digital elevation models and ground data, the team has developed technologies to transform large archives of data into information useful for environmental work. It is now being used by farmers, environmentalists and government teams.

These research efforts have put remote sensing on the map as a key technology for addressing a range of national environmental issues, such as salinity and soil degradation.

Under a framework of continuous improvement that has evolved over many years, the CMIS mathematicians developed the methodology for compiling, analysing and processing the satellite and other remotely sensed data for the Land-cover Change Project.

The CSIRO team also trains and provides quality assurance checks of the work performed by the companies that the AGO subcontracts to do the bulk of the data processing using the CSIRO guidelines. The agreement will generate new business for these high-tech organisations.

The new agreement extends the CSIRO-AGO collaboration to 2008 and identifies



CSIRO works with data such as digital elevation maps, which can provide valuable information for environmental management. Combined with satellite data, for example, they can be used to predict areas at risk from future salinity and guide remedial action. CSIRO

new areas of research to create future maps for managing greenhouse gas emissions, such as exploring alternative data sources to the Landsat satellite, determining from satellite data whether tree plantations are softwood or hardwood, and mapping urban expansion.

The team is also working under the national Water for a Healthy Country Flagship monitoring land condition in catchments in the Great Barrier Reef region and southwest WA.

The technologies, jointly developed by CSIRO and the AGO for the National Carbon Accounting System, made the national Eureka Science Award finals in 2005.

● Carrie Bengston