

## Suzuka Dream Cup 2003



### Aurora Report

Friday 18th July, 2003

#### **AURORA'S NEW PROGRAM FOR 2003-04 'BEAMING' Preparations to Compete in Suzuka 'Dream Cup' Japan Event dates 25-27 July 2003**

Aurora completed its biggest program 'Beyond Dreaming' at the end of 2002. It broke eight solar car world records in the 2001-02 period, finished second in the 2001 WSC, won the Australian Sunrace, circumnavigated Australia and undertook two events in Japan in 2002. This included the 'Dream Cup' at Suzuka.

The Aurora Vehicle Association is starting a new two year program for 2003-04 under the title and the spirit 'Beaming'. A new program of technology improvements underpins the 'Beaming' plan in order to have the Aurora 101 solar car at the forefront of world solar car performance. Many teams around the world are striving to be more competitive in 2003 because of the range of events on offer. These include the Suzuka 'Dream Cup', the American Solar Challenge and the World Solar Challenge.

The Aurora team planned to compete in the Sunrace 2003, the Suzuka 'Dream Cup' and the World Solar Challenge during 2003 and the Phaethon 2004 in Greece next year.

In February, racing the 2001 Aurora RMIT 101 solar car with a new RMIT student team, Aurora won the rain affected Sunrace event. Major technical changes were then commenced to advance the solar car's performance in readiness for the major international events.

### **Technical Preparations**

#### **Solar Array:**

Aurora 101 has 25 separate solar panels featuring gallium arsenide solar cells and Gochermann SolarTechnology panel construction. Ten of these panels have been replaced by new triple junction gallium arsenide solar cells purchased from Emcore. These are cells originally produced by Tecstar named Tec3i cells. The work undertaken at Gochermann Solar Technologies was to produce panels which laid out these triple junction cells in a shingled fashion in order to maximise the working area exposed to sunlight. This is a world first.

The Aurora 101 solar car now has cells from three different NASA space programs including the original Mars lander.



**Matt O'Reilly** checking a galium arsenide cell Gochermann solar panel



**Frank Fittipaldi**, Aurora's battery specialist, with the new Kokam lithium polymer pack for Suzuka

### **Battery Technology:**

A new technology, lithium polymer battery has been adopted for 2003. These batteries are made by Kokam in Korea and increase the energy density available since the lithium ion batteries previously used. Eighteen kilograms of battery makes up the pack for the Suzuka 'Dream Cup'. Much work has gone into pre-testing these batteries and in designing the battery box they are kept in. Attention has been paid to keeping the batteries as cool as possible with 3 fans pushing air through the battery box which itself is ducted to the low pressure extraction duct under the car.

**New Digital Motor Controller from Tritium:** A newly designed motor controller is now being used. This is from Tritium in Queensland and is more efficient than our previous controller. The Tritium controller is better integrated with the MoTeC telemetry unit and promises to provide a wider range of more accurate readings.

**New Roll Bar and Seating Position:** New roll bar rules apply for the Suzuka 'Dream Cup' this year. The rear section is higher than we previously had. This required a new and higher head bubble which in turn required a rearward movement of the driver seating position by 100 mm. A new seat has been constructed with new seatbelt mounting locations.

**Weight Reduction of 25 kg:** The Suzuka 'Dream Cup' favours very light cars because of its hilly layout and tight hairpin corners. The Aurora team has reduced the weight of every part of the solar car with the result that the 25 kg weight reduction target has been achieved. This even went as far as building a new chassis. Koni Topformance and Eibach Springs have contributed to this reduction as have GH Craft with their design of carbon fibre rear wheels. Even with this achievement the best Japanese entries have a significant weight advantage for the Suzuka track.

**Rebuild of Wheelmotors:**

The front wheelmotors of the Aurora 101 solar car originally designed by CSIRO, UTS and Aurora have been rebuilt. They feature magnesium housings. Aurora has for the first time four of these motors available.



**Kon Kotsonis** finishing one of Aurora's 4 wheelmotors

**Durable Tyres:** The Suzuka race track surface is made of coarse gravel which is very tough on tyre wear. Dunlop Solarmax tyres will be used on the Aurora 101 solar car in order to manage the level of tyre wear in this event.



**Brad Trewin** building the main electrical tray



**Paul Jolly** making the new panhard rod for the rear suspension





**Darren Trafford** building a new driver's entry hatch

**Tom Baker** trimming part of the new seat



**Graham Cochrane**, owner of Auto Innovations, painting one of the lightweight wheel spats

## Drivers and Testing

Two new drivers will try their skills at Suzuka. Recent RMIT graduate Kon Kotsonis will be the lead driver backed by 16 year old high school student Damien McArthur. Damien was part of the Aurora team at Suzuka in 2002 and will also be writing special reports for this website.



**Jack and son Damien McArthur** completing a long solar car weekend

One test session with all of this new technology has been undertaken on the 22 June at the Ford Australia high speed loop of their test track near Geelong. This session was mainly to familiarise the drivers with the new controls and the feel of the car at speed. Just 120 kph was achieved.

### **Administration**

We have enjoyed undertaking all of the arrangements for competing in Japan with Michiko Sato of the newspaper Yomiuri Shimbun and wish also to thank Yasuo Kaneko for how he helped the team in 2002.

We look forward to meeting our friend and interpreter Harry Imada, our logistics organiser Kiyoshi Yoshioka from Nippon Express and the TIGA team who have been very helpful with technical advice.

Aurora has been assigned Pit #1 and we hope that the TIGA team is next to us.

The Aurora team departs Melbourne Australia on the afternoon of 21 July and will be operational at the Suzuka race track from midday of 22 July. Daily activity reports will be posted on this site.

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