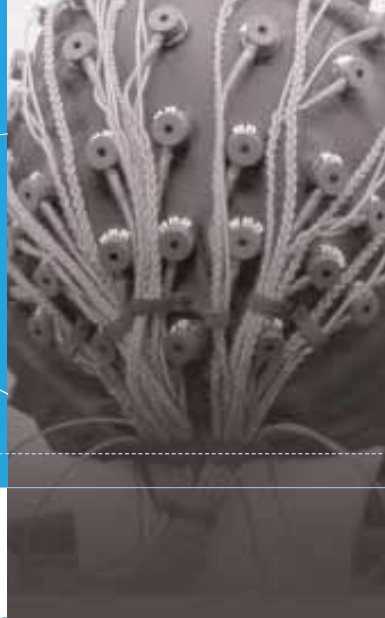


# Compumedics **vista**

A COMPUMEDICS CLIENT UPDATE



## COMPUMEDICS NEUROSCAN — THE EEG/fMRI TECHNOLOGY LEADER

[SEPTEMBER 2004]

Compumedics Neuroscan products are used in around 1500 universities, corporate laboratories and national research institutes in over 50 countries globally. While it is widely accepted that Compumedics Neuroscan is the world's leading supplier of instruments for brain research, it is fast becoming a major player in a new and exciting area of Neurophysiology research that focuses on EEG recorded with fMRI.

It was revealed that Compumedics Neuroscan technology was utilised in the majority of the commercial equipment used in research on interictal EEG/fMRI published to date. The review on Brain Research by the “\*Elsevier” journal,

titled “Studying spontaneous EEG activity with fMRI”, showed 17 published papers in this area, of which 5 had used Neuroscan equipment for their research, 3 had used other commercially available equipment, while the remaining 9 used in-house equipment. Compumedics Neuroscan's most advanced system for recording in the MRI has achieved significant market acceptance over the last 12 months, especially in the US region (see MagLink article on page 2).

\*Source: Salek-Haddadi, A., Friston, K.J., Lemieux, L., Fish, D.R., “Studying spontaneous EEG activity with fMRI”, Elsevier, Brain Research Reviews 43 (2003) 110-133.

## SYNAMPS<sup>2</sup> SHOWCASED IN GERMANY

The world's most powerful EEG amplifier system – the SynAmps<sup>2</sup>, was recently showcased to various universities in Germany.

The tour gave an insight into the technological advancements that have gone into producing this superior amplifier. Each site had the opportunity to experience firsthand, the power and flexibility of the SynAmps<sup>2</sup> technology and its possible applications in their research. With the ability to acquire up to 512 channels, the SynAmps<sup>2</sup> never compromises data quality for quantity of channels, preparation time or cost. Additionally, with the use of MagLink technology, sites were introduced to the

SynAmps<sup>2</sup>'s ability to record EEG in the fMRI environment (see MagLink article on page 2).

The SynAmps<sup>2</sup> was showcased in the cities of Magdeburg, Bielefeld, Münster, Jena, Mainz and Hamburg. The sites visited were involved in the fields of Neurology and Psychology, with interests ranging from pure research to clinical applications.

To find out how the SynAmps<sup>2</sup> can enhance your research or clinical applications, contact your local Compumedics representative for a personal demonstration or more information.



1

Universitätsklinikum Jena – where renowned Professor Hans Berger (1873-1941) recorded the first human electroencephalogram in July 1924.

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# NEW VICTORIAN LAWS FOR SLEEPY DRIVERS

New Victorian laws announced in June will see drivers who fall asleep at the wheel and cause a fatal accident, face up to 20 years in jail. Previously, Victorian drivers would only be charged with dangerous driving, culminating with a 2 year maximum sentence. Now, this offence is being recognised as culpable driving and comes with much higher penalties.

VicRoads estimates that approximately 25% of all fatal road accidents are linked to sleepy drivers. This is the third most common cause after alcohol and drugs.

Dr. John Reid, a neuroscientist and driver behaviour expert from Swinburne University's Brain Sciences Institute, has found that fatigue is more complex than many people realise and just having a power nap may not be helpful.

Dr. Reid has distinguished Excessive Daytime Sleepiness (EDS) as different from physical exhaustion and sleep deprivation. He defines EDS as being excessively tired during the day despite having an apparent normal night's sleep.

Whilst it may be okay for a footballer, who is suffering from physical exhaustion after a game, to drive, it is definitely not safe for someone who has been deprived of sleep. A power nap is unlikely to help the sleep-deprived.

EDS is a major social problem and what's more is that it is hard to diagnose as there are no other obvious physical symptoms. EDS has the

potential to severely affect the quality of life. It may come in short spurts lasting a few minutes to an hour, and comes without warning, and may occur numerous times a day.

## Possible causes of EDS include:

- **Inadequate Sleep** – partying too hard or working long hours
- **Broken Sleep** – Being interrupted by your environment. Eg. Baby crying, snoring
- **Shift Work** – Sleeping at different times to what your body is used to
- **Anxiety, stress or depression** may keep you up at night
- **Alcohol, caffeine, tranquilisers, sleeping pills and anti-histamines** may disrupt sleep patterns.
- **Medical Conditions** – hypothyroid, oesophageal reflux, nocturnal asthma and chronic painful conditions
- **Time Zone Changes** – Jet lag or night shift. Sleep is regulated by the body's internal clock that responds to light.
- **Sleep Disorders** – Sleep apnoea, restless legs syndrome, sleep walking, narcolepsy, and insomnia.

Source: The Herald-Sun, Page 28, 16 June 2004

# COMPUMEDICS NEUROSCAN MAGLINK SYSTEM – RECORDING EEG IN THE FMRI

Interest in the MagLink system has increased dramatically, with new installations doubling over the past 12 months. The widening market acceptance for the MagLink system may be linked to new technological developments that have allowed EEG and MRI to be integrated.

Combining EEG with fMRI provides several important advantages that neither alone can provide. For instance, EEG provides critical timing information about fMRI activation, so that the order of multiple activations may be identified. fMRI data can be used to identify areas of EEG activation for dipole seeding and refined localisation.

Combining EEG and fMRI provides a functional imaging modality that is unmatched in its spatial and temporal capabilities.

While there has been interest in combining these two technologies for quite some time, a complete turnkey solution was not available. Many labs have attempted to modify existing EEG systems for use in the MRI, only to experience the difficulties and dangers that need to be overcome.

The MagLink Cap and Cabling system is a second-generation solution for recording EEG in the MRI that allows EEG to be recorded during the pulse sequence and at higher field strengths.

The passive design of the MagLink carbon fiber cabling allows full bandwidth EEG (DC to 3500 Hz) to be recorded. The MagLink Cap uses a monopolar montage that allows both EEG and ERPs to be obtained. Since no multiplexing occurs, high-density EEG can be obtained with the MagLink system. Advanced algorithms in the SCAN software make it possible to recover EEG and ERP data during the pulse sequence.

As the use of this tool develops, Neuroscan is pleased to offer cutting edge solutions in the completely turnkey, safe and reliable MagLink system. Neuroscan has always been in the forefront of research in the Neurosciences, and that tradition continues with the MagLink system.

For additional information and to discuss a demonstration of this system in your MRI, please contact your local Compumedics representative.

## We welcome our recent US-based MagLink users:

- ① **Albany Medical Center – Albany, NY.**  
**Research Area:** Combining EEG and fMRI to better assess and treat epilepsy.
- ② **University of Pennsylvania – Philadelphia, PA.**  
**Research Area:** Combining EEG and fMRI to assess sleep and sleep deprivation.
- ③ **National Institutes of Health – Bethesda, MD.**  
**Research Area:** Basic research on methods and testing of EEG in the fMRI.
- ④ **California Institute of Technology – Pasadena, CA.**  
**Research Area:** Broad application for the neuroscience community.
- ⑤ **University of California, Irvine – Irvine, CA.**  
**Research Area:** Neurological diagnosis for schizophrenia and other cognitive conditions.
- ⑥ **Washington University of St. Louis – St. Louis, MO.**  
**Research Area:** Combining EEG and fMRI to better assess epilepsy and other neurological conditions.
- ⑦ **Kennedy Krieger Institute – Baltimore, MD.**  
**Research Area:** Assessment of neurological function using a multi modal approach.



# Summit IP™



The Summit IP respiratory effort sensor system is a small-battery powered device that uses true Inductive Plethysmography technology.

Importantly, this device produces a balanced SUM channel output that is useful in showing respiratory paradox, whilst always maintaining the polarity of respiratory effort signals. The SUM channel output is produced by the Summit IP's advanced microprocessor technology that continuously tracks each breath and then automatically balances the output.

In 1999, recommendations from the taskforce of the \*American Academy of Sleep Medicine reflect the consensus that the balanced SUM channel output from a Respiratory Inductive Plethysmography (RIP) system is the preferred signal for research because it has been shown effective in tracking changes in respiratory effort.

Compumedics' expertise in developing and using RIP technology in its PSG systems for the last 15 years has been carefully applied to the development of the Summit IP.

## Summit IP – Features & Benefits

- Preferred, true inductive plethysmography technology
- Linear response to changes in effort
- Balanced SUM channel output
- Continuous, automatic channel balancing
- Operates with any PSG amplifier system
- 800 hours of operation from a small low-cost battery
- Long lasting, reusable sensor bands
- Cost effective and easy to use

This affordable, easy to use technology is available to any lab using any brand of sleep amplifier system, simply with the attachment of standard touch-proof connectors.

Summit IP is currently available for sale in Australia and the USA. For other regions, please contact your local Compumedics representative for the latest updates.

The Summit IP was recently shown at the APSS meeting in Philadelphia, Pennsylvania, USA on the 7-9 June 2004. You can find out more about the Summit IP at Sleep meetings listed in our Events Diary on the back page.

\*Technical reference: Flemons WW, Buysse D, "Recommendations for Syndrome Definition and Measurement Techniques in Clinical Research. The Report of an American Academy of Sleep Medicine Task Force", Sleep, 1999;22(5):667-689.

# MAGLINK

– THE LEAP FORWARD TO TRUE  
FUNCTIONAL IMAGING MODALITY

EEG provides a measure of the electrical activity of the brain. This technique has excellent resolution over time, allowing researchers to measure brain activation with millisecond timing. However, EEG has limitations determining exactly where that activation is coming from, since the weak electrical signals are blurred by layers of tissue and scalp. Advances in high-density recordings and more accurate source models and localisation tools have improved the spatial resolution of EEG greatly over the past several years.

EEG and the event related potential obtained from EEG can now be recorded with great temporal accuracy and acceptable spatial resolution. However, using the leading edge MagLink technology, it is now also possible to combine EEG with those measures that have the highest spatial resolution such as fMRI and in doing this, EEG moves one step closer to a true functional imaging modality (with accuracy in both time and space).

Recent advances in technology and the dedicated effort of the Compumedics Neuroscan research and development team have made simultaneous recording of EEG and fMRI possible. This combined technology allows integrated measurement of the brain's electrical activity and its blood flow. Looking at these measures combined provides a new



tool to study brain function, a tool that has limitless applications in both basic science as well as clinical applications.

As this tool is more fully introduced into the neuroscience community, researchers and clinicians alike will find new uses and applications. As these new applications emerge, the need for recording EEG and fMRI will grow to the point where this tool becomes a standard methodology for both research and clinical applications.

## Reader Contribution

### SLEEP RESEARCH IN THE PHILIPPINES

By Sara Cooper and Karen Waters

In October 2003, a small group of Australian researchers travelled to the Philippines to undertake a genetic/Obstructive Sleep Apnoea (OSA) study on a large Filipino family, where more than 50 family members, representing four generations, were recruited to participate. The study is being undertaken by a group of researchers at the Children's Hospital at Westmead, headed by A/Prof Karen Waters. The project is funded by an NH&MRC project grant, set-up to investigate mechanisms causing metabolic abnormalities in patients with sleep apnoea.

Due to the age mix of the participants, the sleep technologists involved with the project had to perform studies on both adult and paediatric patients. The group included Sara Cooper – a paediatric technologist from the SAN Children's Sleep Disorders Unit and Gilbert Henry from RPAH (Royal Prince Alfred Hospital) Centre for Respiratory Failure and Sleep Disorders. Sherryn

Bibby, the clinical research co-ordinator from the SIDS and Sleep Apnoea research group at the Children's Hospital Westmead participated initially by providing support from Sydney, and later by joining the project in the Philippines. All three researchers are based in Sydney, Australia.

The study took place in Olongopo city, (120km NW of Manila), where two houses were hired for the duration of the project – one for researchers and one for participants. The study used four Compumedics E-Series systems to undertake four sleep studies per night.

Since the sleep studies were being undertaken in houses in the Philippines, and not the controlled environment of a sleep lab, there were many novel challenges. For example, co-sleeping is a common practice in the Philippines, and to preserve the subjects' normal sleeping environment, cables and equipment had to be moved from room to room so that family members could sleep in the same room or bed as one another. On one night, there were six family members sleeping in one bed.

Working out on the field in a foreign country also meant adapting to other, local cultural factors. As is common in non-Western countries, the interpretation of things such as "appointment times" had different meanings for the researchers compared to the subjects, and requests for the families to come early in the evening, often resulted in carloads of people arriving at 9, 10 or even 11pm. Not an Australian interpretation of early evening!

A technical problem that was encountered, and also due to differences between countries, was recurrent EMG problems due to 60Hz noise. The study environment was taken as an opportunity by the local community to set-up a temporary karaoke bar in the lounge room, and singing (a very popular pastime in the Philippines) often started at around 11pm.

Ultimately, the study required a lot of flexibility from the researchers, and permitting the local people to maintain their cultural routines meant that good quality studies could be obtained. After completing the data collection, researcher Sara Cooper said "I would have to rate this experience – and am confident I speak for my colleagues as well – to be one of the most satisfying tasks I have ever undertaken".



The field researchers (from L-R: Gilbert Henry, Sherryn Bibby and Sara Cooper) with their Filipino paediatric subjects.

### CHILDREN'S HOSPITAL IN GERMANY EQUIPPED WITH NEW COMPUMEDICS SYSTEM

In June 2004, Compumedics' E-Series EEG system was installed into the Children's Hospital in Altona, a suburb of Hamburg, Germany. The installation was the result of the Star Care Foundation's donation to the hospital.

The Compumedics E-Series system was chosen for its reputation in the market as a leading EEG system. Installed in the Neuropaediatrics department, the system would provide the children with EEG and video epilepsy monitoring.

With around 200 beds in total, the Children's Hospital sees approximately 9000 in-patients per year and about 9100 out-patients per year. Services offered by the hospital include: Minor Surgery, Neurology, Neonatal ICU, Orthopaedics, Endocrinology, Genetics, Mucoviscidosis, Hydrocephalus, Pulmology, Neuropaediatrics, Urology and specialised ambulance services for Diabetics.

Star Care was founded in 1999 to support social projects for children. Based in Hamburg, Germany and run only by its members who volunteer their time to the organisation, 100% of all revenues generated by Star Care are donated to the children.

For more information on Star Care, a German Language website may be visited at: [www.starcare.de](http://www.starcare.de)



The Children's Hospital in Altona (Hamburg, Germany)

# PROFILE

## JON HANTZSCHE MATERIALS MANAGER (USA)

Based in El Paso, Texas, Jon is responsible for all procurement in the US, negotiations with vendors, and cost savings. He also oversees the production and work flow of all electrode caps, including Quik Caps and MagLink Caps.



Jon Hantzsche  
Materials Manager (USA)

Jon came into the role of Materials Manager in January 2003 and took charge of the NeuroMedical Supplies division for the US region a year later. The NeuroMedical Supplies division manufactures and procures high quality supplies and accessories used in the diagnosis and study of sleep, the nervous system and the brain.



Paul Morahan  
Customer Support  
Specialist (Australia)

The Service Department at Compumedics' Head Office in Australia has expanded to include the services of a Customer Support Specialist. With the creation of this new position, customer support in Australia is now channeled through a central point, whereby, through the establishment of an Issue Tracking Service, all customer issues are resolved and followed up in a timely manner.

Paul Morahan is the new face at Compumedics who is taking on the role of Customer Support Specialist. Paul has worked in both EEG and Sleep laboratories, with experience in both research and clinical environments. Paul promises to be a valuable addition to the Compumedics, and we welcome him to the team.

## ENHANCED SERVICE FOR AUSTRALIAN CUSTOMERS

# Liz's Top 10 Picks of Papers on Sleep Medicine

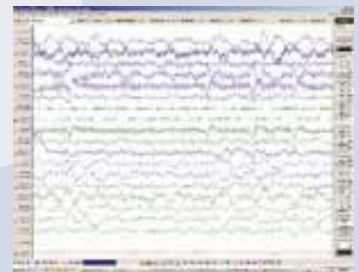
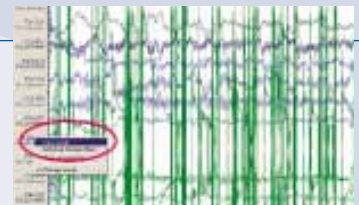
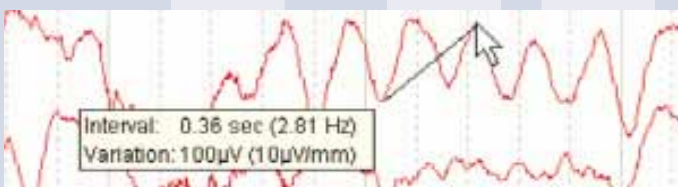
Elizabeth Kealy – Clinical Applications Specialist

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## PROFUSION EEG TIPS & TRICKS

By Paul Morahan – Customer Support Specialist

- Auto-page forward by double-clicking on the right half of the view pane, and page back by double-clicking on the left half. Auto-paging can be stopped by a single click anywhere in the pane – much easier than aiming for the square arrows in the bottom left corner.
- Trimming video before rather than after consolidating, makes consolidation of video files much quicker, as the video files are now smaller.
- To make spacing between groups of related electrodes, go into the Montage Editor and create a channel entry of the location of where you want the gap to be. Set the trace type to 'gap' at the bottom of the middle column. This will create a space between your groups of electrodes.
- ▶ Bad electrode making other channels hard to read? Press 'Keep' on the Sensitivities pane and then right-click on the bad channel's name. Select Trace Setup, change the sensitivity to 1000, and press OK. This will flat-line the bad electrode, making it easier to read the other channels.
- ▼ Calipers may be brought up by pressing Control + left-clicking on the view pane. With this tool you can dynamically examine the amplitude, period and frequency of a waveform by selecting appropriate points.



DATE	BOOTH#	AREA	TRADESHOW/EVENT	LOCATION	COUNTRY
<b>Americas – Tradeshows and Events</b>					
August 27		S	New England Polysomnographic Society	Sturbridge, MA	USA
September 9-10		N	Regional Neuroscan School	Delray Beach, FL	USA
September 10		S	Wisconsin Society of END Technologists	Marshfield, WI	USA
September 10-11		S	Concepts in Sleep Conference	St Petersburg, FL	USA
September 17		S	Sleep Medicine 2004	Dublin, OH	USA
September 29 – October 2		NS	ACNS (American Clinical Neurophysiology Society) Annual Meeting	Montreal	Canada
September 30 – October 1		S	Razor City/Campbell County Respiratory Therapist Seminar	Gillette, WY	USA
October 7-9	413	NS	AAPM&R (American Academy of Physical Medicine and Rehabilitation)	Phoenix AZ	USA
October 7-10		S	SE/SW Region – Association of Polysomnographic Technologists	Coconut Grove, FL	USA
October 11-15		N	Comprehensive Review Neuroscan School	El Paso, TX	USA
October 15-16		S	Michigan Sleep Disorders Association	Traverse City, MI	USA
October 18-20		S	APT (Association of Polysomnographic Technologists)	Reno, NV	USA
October 20-24		N	Society for Psychophysiological Research	Santa Fe, NM	USA
October 24-27		N	Society for Neuroscience	San Diego, CA	USA
October 26-28	440	G	Medtrade	Orlando, FL	USA
November 3-6		NS	AAEM (American Association of Electrodiagnostic Medicine)	Savannah, GA	USA
November 5		S	Sleep Disorders Center of Virginia	Glen Allen, VA	USA
November 12		S	Wellmont Health System Educational Program	Kingsport, TN	USA
November 28 – December 3	1054	N	RSNA (Radiology Society of North America)	Chicago, IL	USA
December 4-6		S	AARC (American Association for Respiratory Care Meeting)	New Orleans, LA	USA
December 5-7		N, NS	AES (American Epilepsy Society)	New Orleans, LA	USA
December 10		S	Carilion Topics in Respiratory & Sleep 2004	Roanoke, VA	USA
<b>Rest of World – Tradeshows and Events</b>					
August 28-30	B7	NS	AOEC (Asian & Oceanian Epilepsy Congress)	Bangkok	Thailand
September 4-8	E70	S	ERS (European Respiratory Society)	Glasgow	Scotland
September 15-17	M27	G	HospilMedica Asia	Suntec City	Singapore
September 15-17		N	Brisbane Neuroscan School	Brisbane	Australia
September 15-19		N, NS	German Association for Clinical Neurophysiology and Functional Imaging	Jena	Germany
September 18-23	20	N	World Congress of Psychophysiology	Thessaloniki, Chalkidiki	Greece
September 24-28	B2	S	1st Sino-American International Conference on Sleep Disordered Breathing	Beijing	China
September 27 – October 1		N	London Neuroscan School	London	England
October 4-6		N	Barcelona Neuroscan School	Barcelona	Spain
October 5-9	10	S	ESRS (European Sleep Research Society)	Prague	Czech Republic
October 15-17	11-12	S	ASA/ASTA (Australasian Sleep Association / Australasian Sleep Technologists Association) Annual Meeting	Star City, Sydney	Australia
October 22		NS	NZSNT (New Zealand Society of Neurophysiology Technicians)	Gisborne	New Zealand
November 3-5	22	NS	ESA (Epilepsy Society of Australia)	Star City, Sydney	Australia
November 24-27	9D46	G	Medica	Duesseldorf	Germany
December 4-7		N	13th German EEG/EP Mapping Meeting	Giessen	Germany
December 10-12		N	ASP (Australian Society of Psychophysiology) Annual Meeting	Melbourne	Australia

## THE COMPUMEDICS DIVISIONS

### Defining Life's Signals

Compumedics' operations consist of four divisions – each with its own product focus:



**Compumedics Sleep**  
Clinical Diagnostic Systems  
for Sleep Disorders



**Compumedics Neuroscience**  
Clinical Diagnostic Systems  
for Neurophysiology



**Compumedics Neuroscan**  
World-leading Research  
EEG/ERP systems



**Compumedics Neuromedical Supplies**  
Electrodes, sensors  
and supplies for Neurology  
and Sleep laboratories

If you would like to receive the Compumedics Vista Update via Email, please send your details and email address to [vistaupdate@compumedics.com.au](mailto:vistaupdate@compumedics.com.au)

## SUGGESTION BOX

The Compumedics Vista Update is for you – our valued customers. Any comments, suggestions or feedback you may have on Compumedics Vista would be greatly appreciated.

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## READER CONTRIBUTIONS:

Compumedics welcomes any article contributions made by our readers. Two Movie Passes will be given to the contributor of any article used in the Compumedics Vista Update.

Please forward all contributions to:  
Email: [vistaupdate@compumedics.com.au](mailto:vistaupdate@compumedics.com.au)

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