The consortium, on 10 and 11 February, will be opened with a keynote address by New Zealand’s Minister for Economic Development and Industry and Regional Development, the Hon Jim Anderton.

The event is themed Industry Creativity Research: Partners in Innovation. Registrations are now open. It is expected to attract 200 guests from New Zealand and around the globe who will be exploring how to create partnerships between the essential elements of successful collaboration... creativity, research and industry.

A rising star in the world of collaborative computing, Dr Carl Gutwin, will be giving a keynote address as will MIT’s Associate Professor of Media Arts and Sciences Hiroshi Ishii, an expert researcher in human-computer interaction.

Dr Gutwin has undergraduate degrees in English literature and Computer Science, and received his PhD in Computer Science from the University of Calgary where he worked on issues of group awareness in real-time distributed groupware. He is currently Associate Professor of Computer Science at the University of Saskatchewan, and holds a Canada Research Chair in Next-Generation Groupware.

Associate Professor Ishii is an expert researcher in human-computer interaction who regularly collaborates on projects that blur the boundaries between a variety of arts, design, and scientific disciplines. Professor Ishii is co-director of MIT Media Lab’s Things That Think (TTT) consortium, and director the Lab’s Tangible Media group.

(continued on page 2)
Also attending the consortium will be Professor Tom Furness, Founding Director of the HIT Lab at the University of Washington and the international director of HIT Lab NZ Ltd, as well as representatives from a number of national and international companies.

HIT Lab NZ Director Mark Billinghurst says innovation is the eureka of discovery partnered with clever commercialisation. It is the successful partnering of creativity and entrepreneurship.

Partnerships between research institutions and industry are essential to promoting a culture of innovation and to taking technology forward. They draw together those who produce new knowledge with those who know how to use it productively, he says.

Day one on 10 February is open to non-consortium members and includes keynote speeches as well as demonstrations of technologies from participating companies, partner universities and the HIT Lab.

In the evening there will be a virtual ARt-themed cocktail party in the stunning new Christchurch Art Gallery.

Cost to non-consortium members is $200 if registering before 7 January or $250 thereafter. The cost includes lunch and the cocktail party.

Day two on 11 February is for consortium members-only, and includes workshops and student presentations plus a dinner in the evening.

Registrations can be done online at http://www.hitlabnz.org or contact Anna-Lee Mason anna-lee.mason@hitlabnz.org

HIT Lab NZ Phone: 03 364 2358 (+64 3 364 2358) Mobile: 027 444 0397

For more information on Dr Carl Gutwin visit: http://www.cs.usask.ca/faculty/gutwin/

For more information on Associate Professor Hiroshi Ishii visit: http://web.media.mit.edu/~ishii/

For more information on Professor Tom Furness and the HIT Lab US at the University of Washington go to: http://www.hitl.washington.edu/

In keeping with being a cutting edge technology company, the HIT Lab NZ’s old website, set up when HIT Lab was established three years ago, has been given an upbeat revamp.

The new look website will be live on 1 January.

The design brief was for a site that is fresh and clean, accessible and technologically with-it but not over-engineered. The project, coordinated by marketing communications consultant Deb Parker, has been carried out by Masters student Trond Nilsen and intern Tobias Gefken. Tobi has been responsible for the design while Trond has worked on a new content management system.

The new home page uses an animated version of the branding style introduced to HIT Lab marketing collateral last year, and overall, the navigation has been improved and made easier to follow.

Other areas of the site have been revamped to be more welcoming, especially the People pages, where the aim has been to give an impression of the activity that happens in the Lab. People can also now be searched alphabetically or by category. The projects pages are also being updated.

The site is being managed through a new content management system designed in the Lab which will be easy to use and allow more immediate updating of material on the site. There will be progressive behind-the-scenes improvements to this system in the New Year.

Have a look at the site from 1 January and forward any comments to info@hitlabnz.org

New-look website for HIT Lab NZ
EU-NZ education pilot programme launched

New Zealand students have the opportunity to study high-level interaction design in Europe through a new European Union/New Zealand pilot education exchange programme.

Leonardo, a multi-national exploration in Interaction Design education and research, is the successful consortium in the EU/NZ Cooperation in Higher Education Pilot Project.

The HIT Lab along with the University of Waikato and the Wanganui School of Design are working together with the Universities of Lancaster and Nottingham in the UK, the University of Ljubljana (Slovenia) and the Upper Austria University of Applied Sciences (Hagenberg, Austria) on the three year exchange programme.

A minimum of 24 local students will take part, with New Zealand universities hosting a similar number of EU students also studying interaction design at the post-graduate level. The programme also allows for an exchange of faculty members.

New Zealand’s Associate Education Minister (Tertiary) Steve Maharey says the programme will enable New Zealand students to bring home valuable international knowledge.

"If New Zealand is to be a birthplace of world-changing people and ideas, we need to provide more opportunities for our emerging knowledge leaders to interact with other leading thinkers from around the world."

Maurice Maxwell, Head of the European Commission Delegation in Wellington, said: “This pilot programme will further strengthen the ties between the European Union and New Zealand and potentially serve as a model for future cooperation in higher education”.

Interaction design generally deals with improving the interfaces between machinery and people and the future focus is on how humans access digital technology.

The Leonardo project was jointly selected by the Tertiary Education Commission and the European Commission in a competitive process that attracted high quality applications.

Modelled on existing EU-Australia and EU-United States projects, it was developed from discussions between New Zealand Education Minister Trevor Mallard and European Commission officials last year.

The government is providing $200,000 annually for three years to fund New Zealand's share of the pilot, which requires the students involved to study in at least two of the four EU institutions. The European Commission will provide similar funding.

EU students will be required to study at one of the New Zealand institutions and another EU university. For the New Zealand students it means spending between an academic term and a year studying in Europe, as well as time studying at home in New Zealand.

Students are expected to pay their normal tuition and other fees to their home institution, and be hosted when they study at one of the others. New Zealand students will also be entitled to an average allowance of $NZ1,400 per month and an average $NZ2,000 towards travel costs.
Artists fellowships established

The HIT Lab NZ has launched a series of artists fellowships to be offered in conjunction with the Converge05 conference in Christchurch next year. Converge 05 (www.converge.co.nz) is an innovative new conference planned to celebrate the creative explosion that occurs at the convergence of art, technology and business. More than 500 of New Zealand’s most creative people will attend the conference in Christchurch from May 28 to June 3.

In conjunction with the conference, the HIT Lab NZ is offering artist fellowships that will allow artists to have access to HIT Lab NZ technology, staff and students to create new interactive works for display at Converge05. These new works should capture the theme of Convergence in some way. In order to maximise the number and strength of the collaborations, there are three possible levels of involvement:

- Full Fellows will work at a detailed level with the HIT Lab NZ, creating both a new technological medium and the content to utilise it. Because this will be resource intensive, only one or two Full Fellowships will be available.

- Content Fellows will be able to use any of the technological media the HIT Lab NZ already has available and modify it to suit their artistic content. As this is less resource-intensive, three to six Content Fellowships will be available.

- Unit Fellows will be able to contribute virtual, 3D works that can be exhibited within an Augmented Reality book and in an online gallery. Tutorials and 3D software will be made available to any interested parties and up to 30 works will be exhibited.

Selected potential applicants for the Full Fellowships and Content Fellowships have already been approached. However, Unit Fellowships are open to any applicant. Both Full and Content Fellows will be provided with travel and accommodation funding that will allow them to work alongside HIT Lab NZ staff and students to make their creative vision a reality. All Fellows will also be able to attend a series of workshops over five months (January to May 2005) that will expose them to HIT Lab NZ technology and explore how this technology can be used to create compelling art. The workshops will be as open as possible and the resources will be made available to anyone unable to attend in person.

Many of the technologies being developed by the HIT Lab NZ are ideal for use in interactive art pieces. This includes technologies such as large touch screens, computer vision based people tracking, stereo projection and augmented and virtual reality.

The new art pieces created will be shown at the Converge05 conference where the artists will have the chance to talk about their work in front of the leading artists, scientists and business people. Artists interested in the Unit Fellowships should send their portfolio/resume and a one to two page description of potential concepts for an interactive art piece on the theme of convergence. Examples of existing technological media can be found at www.hitlabnz.org/index.php?page=projects and www.mindspacesolutions.com/imaginality.

Send applications to:
Eric Woods
HIT Lab NZ
University of Canterbury
Private Bag 4800
Christchurch

Or for more information contact Eric on 03 3642 135 or via email at eric.woods@hitlabnz.org.
From the International Director

It seems like new opportunities spring forth from this verdant space every day. We are now beginning to see commercialisation opportunities for the Lab as well. This maturing of the New Zealand HIT Lab also gives greater credibility to the notion of an international federation of HIT Labs.

Other countries such as Singapore, Australia, Taiwan, France, England, Korea and Mexico have expressed interest in adopting and licensing the HIT Lab model, stimulated in part by the Lab’s success in New Zealand. We anticipate that part of the outreach in New Zealand will be to bring other universities into the HIT Lab NZ community in addition to Canterbury... thereby strengthening the talent pool and engaging more brains in developing the future of human to machine interfaces.

Along with the HIT Lab NZ, the HIT Lab US continues to prosper. We have enjoyed a season of high visibility in the international press with our work in Virtual Therapy, Wearable Low Vision Aids and Microendoscopy.

In August we held our 24th workshop of the Virtual Worlds Consortium. Several HIT Lab NZ folks participated along with representatives from two New Zealand Consortium companies.

We were inspired by Prof. Ian Foster discussing the global grid computing initiative and Dr. Donna Shirley, the director of the newly from Science Fiction Museum, discussing how virtual interface technology can combine with science fiction as a stimulating educational medium. I look forward to returning to New Zealand in January 2005 to spend about four months working closely with my friends and colleagues there. 2005 is going to be a great year for all the HIT labs!

Tom Furness
International Director

Helping right hand drivers to Keep Left

Drivers who drive on the wrong side of the road are a hazard both to themselves and other traffic on the road. A new project underway at the University of Canterbury is using Psychology Department and HIT Lab NZ expertise to investigate potential ways of reducing this problem.

Of the injuries from accidents in New Zealand in 2001, 3% were the result of people driving on the wrong side of the road. However these accidents are typically far more serious than most, producing 31% of the fatalities on the road.

The problem is particularly common with tourists from countries where driving on the right hand side of the road is normal. As the numbers of tourists to New Zealand continue to increase — visitors from right hand drive countries alone are expected to increase from 1 million in 2003 to 1.7 million by 2009 — this problem is likely to get worse.

Keep Left is a project looking at the phenomenon of wrong side driving behaviour and the leading factors that cause it with the aim of developing methods that will reduce its occurrence.

It is being led by University of Canterbury psychology lecturer Dr Dean Owen, in collaboration with computer interface researchers and usability experts at the HIT Lab NZ.

Dr Owen has 30 years experience in experimental Psychology and usability evaluation. He leads the University of Canterbury’s driving simulator research (continued on page 6)
and has studied road crossing and driver behaviour in virtual environments. Before arriving at the University of Canterbury, Dr. Owen worked as an experimental psychologist at NASA, conducting research in zero-gravity performance and similar astronaut studies.

Keep Left is using the Department of Psychology's immersive driving simulator — the only fully immersive driving simulator in New Zealand — and software designed at the HIT Lab to produce the visual and audio cues that lead to wrong side driving behaviour. The software development is being done in C/C++ on the Windows platform using the OpenGL graphics library. Volunteers are being drawn from several groups of people: tourists new to New Zealand, international students, and recent immigrants, based on their native country (right hand drive countries), level of driving experience, accident history, and gender and age (to ensure a wide diversity of users).

Data collected will include motion path data for the car, response time, gaze and head motion, response to simulated emergencies, subjective driver impressions and interview comments.

The data captured from the simulator will be used to design a set of visual and auditory cues that can be provided to the driver to reduce the occurrence of wrong side driving.

One of the main ways to reduce accidents is to give drivers more reaction time.

Typical cues could be an audio warning when the car is detected drifting over the centre line, or a visual icon on the windshield or rear view mirror reminding the driver to "Keep Left". However, the possible distraction caused by these cues is also being considered.

In 2004, the total cost to New Zealand of road accidents is projected to be $2.75 billion NZ, resulting from 5,900 hospitalisations and 400 deaths. Around 30% of these deaths will be from head on collisions, so even a small percentage reduction in this figure will save millions of dollars per year.

Keep Left is being funded by road safety and transport authorities and is expected to be completed by March next year.

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**Looking back to the Future**

Do you want to know the Next Big Thing? The new technology that will be in our living rooms ten years from now? If so, you just need to look back to see what has been developed in the research labs in the last five to ten years. Bill Buxton, a famous interface researcher, wrote an article in Time magazine in October about predicting the future. In it he described how technologies always take several decades to go from invention to commercialisation and popular use. He made the astute observation that the future is already here - in the university and corporate research labs.

Just as Bill Buxton observed, I really believe that we are building the future here in New Zealand. We are doing this in two ways. First, by developing innovative technology. Some of the projects we are working on have strong commercial potential. For example, the multi-touch display we are developing for the Aichi World Expo could be used in museum settings or even in the home as large format displays become commonplace. Or the computer vision based motion capture system we developed for the Boston Museum of Science could be used in a wide variety of entertainment settings.

Secondly, and more importantly, by developing people that will build the future. This year our first Masters student, Chandra Harrison, graduated. She is now working at Siemens Corporate Research in New Jersey on advanced medical interfaces and next year will start her PhD in London. Our first batch of honours students finished, including Kushal Vaghani, who has just begun work at Sidhe, New Zealand’s leading computer game company. He was chosen for the job because of the computer vision skills he developed working on HIT Lab NZ projects and Sidhe recognizing the emerging trend for computer vision based games, such as the huge success of the Sony EyeToy. It is people like Chandra and Kushal who will build the future and I am extremely proud of them and the work that they and the other dozen students who have graduated have done.

As the HIT Lab NZ’s second full year finishes it is time for reflection. We have had a great year and most of that is due to the fantastic staff and students that we have and the strong support we have received from the Department of Psychology, the Faculty of Science, and the University of Canterbury.

I hope to see each of you next year at our third annual consortium conference where we can plan how to build the future together. Please reserve February 10th 2005 in your calendar now.

Season’s Greetings

Mark Billinghurst
Stunning interactive display for AICHI 2005

A team at the HIT Lab has developed a dramatic and visually stunning interactive display for the World Expo 2005 in Japan next year.

The display features huge touch screens about two metres long by one metre high. Five of the screens are linked around a circular room to display giant panoramics of New Zealand scenes and tourist activities. People can touch virtual bubbles floating from screen-to-screen to play videos and slideshows of New Zealand features. Each screen has a rear projector with an infra-red camera which can only see people's hands interacting with the displayed images. This unique technology can track dozens of hands at the same time and also recognise hand shapes.

A team of seven people at the HIT Lab — David Thompson, Marilyn Lim, Michael Herchel, Christiaan Gough, Robert Grant, Marcel Lancelle and Richard Bishop — led by Dr Richard Green developed this innovative technology throughout this year.

The World Expo 2005 will be held in Seto City, Nagakute Town and Toyota City in Aichi region (central Japan with Nagoya city as its capital) in an area covering approximately 173 hectares, with pavilions, walkways and interactive zones. There is opportunity for interactive fun as well as serious showcasing of the latest in technology.

The theme for Expo 2005 is Nature’s Wisdom. Expo organisers say that new ideas and technologies must be developed in order to end practices that cause irreparable damage to the environment. "The focus of Expo 2005 is that the true meaning of technology is to draw out the hidden potential of nature so that it has new purpose. This new purpose must include environmental, technological and cultural concerns about local and global development".
An interactive information platform developed by PhD student Marcel Lancelle was successfully used in a community project in Christchurch’s Westfield Mall last month.

The Westfield Riccarton Mall is one of New Zealand’s largest and has recently undergone extensive redevelopment.

The display used an information screen Marcel developed for an ACID project. The Australasian CRC (Cooperative Research Centre) for Interaction Design Pty Ltd or ACID (see panel) aims to support communities and groups with the latest technologies, and HIT Lab is teaming up with the organisation on a number of projects.

Based on a survey in the mall of what people wanted to see, Marcel worked on the information platform in conjunction with the mall management.

Essentially, the content included a map of the mall and Christchurch and real time bus information, weather and news, photographs, a history of the mall and a welcome screen with information on the mall management.

The set up used a PC with a TV as monitor and NextWindow, an infrared light based touch frame.

ACID is an Australian Government funded Cooperative Research Centre [CRC]. An initiative of the Department of Education Science and Training, the CRC Programme was established to improve the effectiveness of Australia’s R and D efforts by linking researchers with industry.
puredepth markets a multi layer display technology developed by its parent company Deep Video Imaging Ltd. Winner of the R&D 100 award for the top 100 technological innovations, Deep Video Imaging is the world leader in Multi-Layer Display (MLD™ '99) technology. MLD™ '99 technology is scalable in size, resolution, brightness and colour depth. The additional depth provides simultaneous dual plane application support without glasses, viewing restrictions or special software requirements, and is compatible with all existing software and hardware platforms. MLD™ '99 monitors have also been proven to reduce search times in complex data analysis. With worldwide patents granted and pending, Deep Video Imaging has representation in the USA, Singapore, and New Zealand, with distribution partners in North America, Japan, Korea, Australia and Europe.

Warren and Mahoney

Warren and Mahoney is one of New Zealand's leading architectural practices with a reputation for high quality award-winning work and innovation in design over a wide range of diverse and complex projects. The practice was founded by Miles Warren in Christchurch in 1955. In 1958 he was joined by Maurice Mahoney and the partnership of Warren and Mahoney was established. A Wellington office was opened in 1974 and an Auckland office in 1986. The company was incorporated in 1985.

ZoDAL is an international marketing design agency based in Christchurch, New Zealand. The multilingual team supplies a broad range of creative solutions to local and international clients aiming to introduce new products and services, rejuvenate existing brands or update and redefine their image. Specialties include developing online campaigns by way of design influenced e-commerce software, as well as optimized online advertising through animation and video.

The company specialises in innovative Macromedia Flash applications.
New faces at the Lab

A number of new people have joined the Hit Lab team over the past few months. They are:

**Tobias Gefken — Germany**

Tobi is a Media System Design student in the school of Media at the University of Applied Sciences in Darmstadt, Germany. He has just finished his last exam. During his eight month internship at the HIT Lab NZ, he will complete his studies and diploma thesis and increase his knowledge of “Unlocking the Power of Human Intelligence”. He enjoys Media System Design as it is a mixed study and covers the basics of information technology, design and economics. He finds this an interesting and challenging combination. In his spare time, Tobi enjoys playing soccer, tramping through New Zealand’s countryside, listening to music and spending time with his friends.

**Michael Haller — Austria**

Michael Haller is senior lecturer at the Upper Austria University of Applied Sciences (Media Technology and Design, Digital Media), where he is researching real-time computer graphics, augmented reality, virtual reality, and human-computer interaction. From 2001 to 2004 he directed the "AMIRE" research project on authoring augmented reality. He received his Master of Science in 1997 and PhD in 2001 from the University of Linz (Austria).

Michael’s main goal for the next six months is to intensify the cooperation between the HIT Lab and his University by the following activities: Firstly, the installation of the Leonardo project, which is a EU/NZ funded project for student/teacher mobility between Europe and New Zealand. Secondly, the combination of research results of MTD and HIT Lab. More concretely, Michael wants to set up a MR environment for the office of tomorrow. Finally, the goal is to contribute know-how in CG and shader programming and to benefit of the researchers at the HIT Lab. Michael’s personal interests in NZ include cinema, museums, traveling, and having more time for crazy sport activities.

**Michael Herchel — Germany**

After finishing his apprenticeship as an IT specialist, Michael began studying Computer Engineering at the University of Applied Sciences Ulm.
He is currently doing a six month internship at the HIT Lab NZ. Michael is very interested in programming, databases, web programming, software engineering, networks and learning about all the things that make up the HIT Lab’s international reputation. His favourite hobby is travelling around the world. He also plays soccer, enjoys socialising and cooking.

**Johan Karlsson — Sweden**

Johan Karlsson is studying Media Technology at the Department of Science and Technology, Linköpings University, Sweden. After several years of focusing on the area of Visualization, Image based Lighting, Rendering and Modeling he is now working on his Masters thesis at the HIT Lab N.Z. The thesis will concentrate on how to make the virtual object, when inserted into the real world, blend in more naturally. This will be done using the image-based lighting, capturing the light in the room and then applying lighting and shadows from the acquired data. Johan’s special interests are software design of augmented reality and computer graphics applications.

His former background in the AR area is based on projects during his education. Under the supervision of Dr. Mark Ollila he has worked on the development of a 3D Scanner using stereo vision and a motion capture system using AR-toolkit. In his spare time he tries to find new ways to create adrenaline. He enjoys all sports including extreme sports and is looking forward to the great variety of challenges in New Zealand.

**Felix Loew — Germany**

Felix Loew is studying computer science at the Technical University in Munich, Germany. Having a major focus on Augmented Reality, Context-Awareness and software Engineering during his studies he finished his Masters exams in April. At the HIT Lab he is developing his Masters thesis on the research area of Hybrid Tracking. For the next six months the focus will be on an improvement of the new ARToolkit version supporting N atural Feature Tracking using Hybrid Tracking techniques.

Special interests of Felix are software design of augmented reality applications, requirements elicitation and UI design. His background in AR is based on projects and seminars at Prof. Gudrun Klinker’s Augmented Reality group in Munich and on a cooperation with the start-up company Augmented Solutions (a development of the Augmented Furniture Client). In his spare time he spends time playing his guitar and writing songs. He is involved in the education of guides for children groups and leads a tent camp for children every year. He is also keen on hiking and mountain biking in New Zealand and although he is enjoying New Zealand a lot, he misses the Munich beer.

**Mikael Selegård — Sweden**

Mikael Selegård is studying Media Technology and Computer Graphics at the University of Linköping, Sweden. His focus has been on Computer Visualization and 3D Visual effects. At the HIT Lab Mikael is doing his Masters thesis in computer graphics, researching on new realistic real-time lighting and shadowing techniques to be used in AR.

Mikael is also interested in commercialisation of new products and wants to look at the possibilities of doing this in the area of Augmented Reality. In his spare time Mikael likes watching movies, scuba diving, traveling and exercise action sports such as mountain biking and wakeboard. During his visit in New Zealand he wants to travel around and see the country and also try as many new action sports as he can afford. He would especially like to try paragliding, kite boarding and rafting.

**Michael Siggelkow — Germany**

Michael Siggelkow is a student of computer science at the Technische Universität München (Germany) and finished his exams earlier this year. Researching on his diploma thesis he is now working for six months at the HIT Lab N.Z.

His thesis focuses on Hybrid Tracking approaches combining AR Toolkit, inertial sensors and other vision based tracking ideas. He is also interested in different user interaction techniques like speech or gestures recognition. During his studies he concentrated on distributed applications, collaborative working, software engineering and web services. In some practical courses he also gained experience in database and web programming.

At his time at Rohde & Schwarz, Munich, where he worked for an internship, he attained some knowledge of cellular phone networks. In his spare time Michael likes hanging around with his friends and enjoys exploring the amazing nature of New Zealand by bike or during exhausting hikes.

**Thomas Zurbruegg — Switzerland**

Thomas has studied Electrical Engineering and Information Technology in the Masters course at the Swiss Federal Institute of Technology in Zurich, Switzerland. The main focus of his studies was integrated electronics, wearable computing and acoustics.

His first semester project dealt with Functional Electrical Stimulation (FES) enabling a hand grasp function in patients with paralysed muscles. In his second semester project, he designed a Digital Audio Preamplifier on an Integrated Circuit that was subsequently manufactured and successfully tested.

Thomas joined the HIT Lab last month for six months to work on his Masters thesis. The subject of his work is research on haptic force feedback control for sensored wheelchairs and the implementation of a prototype system.

In his spare time Thomas likes music and spends a lot of time with private electronic sound visualisation projects. He used to organise scout summer camps for handicapped children and was an active member of his home university student organisation. When it comes to sports he particularly likes mountaineering and rock climbing.