
DIGITAL EARTH CONFERENCE REPORT BACK

1. Purpose of Report

To report back to all Councillors on the Digital Earth Conference 2006.

2. Recommendation

It is recommended that the Committee:

- 1. Receive the information.*

3. Details of the Conference

"A Digital Earth could provide a mechanism for users to navigate and search for geospatial information - and for producers to publish it. The Digital Earth would be composed of both the 'user interface' - a browsable, 3D version of the planet available at various levels of resolution, a rapidly growing universe of networked geospatial information, and the mechanisms for integrating and displaying information from multiple sources." — Al Gore

What began in 1998 as a concerted US Government initiative with significant international interest and support has become a global consortium of disparate organisations loosely organised around a biennial **International Symposium for Digital Earth (ISDE)**.

The International Steering Committee for the ISDE includes:

- David Schell, Open Geospatial Consortium, USA
- Jack Dangermond, ESRI, Inc., USA
- Prof. Milan Konecny, Dept of Geography, Masaryk University, Czech Republic
- Preetha Pulusani, Intergraph Corporation, USA
- Dr. Manfred Ehlers, Forschungszentrum für Geoinformatik und Fernerkundung, Germany
- Prof. Guo Huadong, Institute of Remote Sensing Applications (IRSA), China
- Prof. Vladimir Tikunov, Faculty of Geography, Moscow State University, Russia
- Dr. Timothy W. Foresman, International Centre for Remote Sensing Education, Inc., USA

The next full Symposium is scheduled for 2007 in San Francisco. It was an interim Digital Earth '06 Summit for Sustainability that was held in New Zealand.

The conference was held at Auckland's Aotea Centre in August 2006. There was considerable commitment by the organisers to sustainability – the materials were in cotton shopping bags, recycling was available; carbon offsets for speakers' flights were included in the conference fees.

Although several officers apparently intended to go, only Cr Wade-Brown attended from Wellington City Council. Many other councils were also represented.

4. Speakers and Subjects Covered

The Right Hon. Helen Clark PM opened the Digital Earth conference. Several cabinet ministers attended.

Ms Clark noted that it was a speech by Al Gore that initiated Digital Earth and that she was impressed with his film, "An Inconvenient Truth".

She neatly assessed the main conference debate as between those who see innovative technology as the whole answer whatever else we do and those who see it has a part to play.

She acknowledged the presence of youth and referred to this planet as the home we all share. She said we face extremely challenging ecological challenges – climate change, biodiversity and the development of mega cities and urged the responsibility of all of us to take collective action.

She noted that no other developed country is as vulnerable as NZ to Climate Change.

Post 1992 (Rio Summit), the NZ government agreed four areas of sustainable development to focus on – energy, quality & allocation of water, sustainable cities & youth.

"In C21st, we need close collaboration between central and local government, business & industry, including the Sustainable Council of Business Development.

Sustainability is now a key principle –it's inherent in the Land Transport Management Act & Local Govt Act. LTCCPs are now been drawn up trying to achieve the four wellbeings. The NZ Energy Strategy is being developed with strong focus on renewables.

NZ has committed to Kyoto and this is not an easy issue since our profile is unique with CH₄ from ruminants making up such a high proportion of our greenhouse gases.

A focus on cities is essential since 87% of NZ population is urban. There's a strong focus on Auckland and how it does or does not function. Traffic gridlock, water shortages and energy blackouts are not good enough. Now different Councils are working together more effectively so Auckland can become a more sustainable city."

Dr Tim Foresman, ex NASA, requested we dispense with the argument about whether climate change is happening, look at pragmatic responses and apply technology. He spoke eloquently about how we came out of cosmic inchoate chaos and that spaceship earth is our home. He used images to emphasise how little air and water there is – and the stakes are high in sustainability – all life forms including the human species.

Digital Earth is a compelling vision to harmonise our collective societal actions to sustain life on planet earth. He traced the origins of Digital Earth concept and thanked the Chinese for taking up the international leadership of Digital Earth.

We need to learn from past societal collapse such as Rapanui Island (Easter Island).

He noted that New Zealand was second after Lebanon in car ownership per capita, which he didn't find impressive. He noted that most people are not engaged with the real world and his bottom line of "it's sustainable living, stupid!" The grim reality is that entertainment and play motivate people.

James Kunstler, author of *The Long Emergency*, which is well worth reading, summed up the global situation as "We're in trouble." He emphasised that global peak oil production is a fact not a theory and he believes that the peak was in December 2005. The production from the ten biggest oil-producing states is down by 3% and their consumption is going up, with exports down by 5%. The composition of oilfields is becoming more heavy and sour. He said "There will not be a hydrogen economy" and urged all whose only question was "How do we keep the cars running?" to *move on* based on the premise that none of the alternative fuels will allow systems to run as they do now. He quoted Dick Cheney as saying "The American Way of Life is non-negotiable." but suggested that if reality is the new negotiating power the question becomes either gradual or forced change.

He lamented adults seriously believing one can "wish upon a star" as an impediment to thinking. The second pernicious block was the general American dream of unearned riches (as in Las Vegas) i.e. getting something for nothing. Thus Americans dream that technology will provide fuel, whereas that equivalence is an illusion. He suggested that a project we CAN do is to restore the railroad system and wondered what on earth NZ was thinking to have the Overlander cease. We will need ships and trains to move goods. There's no

rescue remedy for the coming energy problems but there is an intelligent response – downscaling activities and localising daily life. It would be an exercise in futility to prop up sprawling suburbia.

We need to reconstruct our public realm and our sense of place. The key unintended consequence of the automobile was degradation of the public realm. Much of what has been built post 1940 has created places not worth caring about.

When asked whether there was hope for the future he said there must be if we are capable of working. He was trenchant in his criticism of self-esteem being considered an asset to be distributed rather than emerging from good work. He made an analogy between cocaine and unfounded self-esteem – both make you feel good but accomplish nothing.

Amory Lovins, cofounder and CEO of Rocky Mountain Institute, is a consultant experimental physicist educated at Harvard and Oxford. *Newsweek* suggests he is one of the Western world's most influential energy thinkers. He recognised the same energy challenges as Kunstler but was more optimistic about possible outcomes.

He sees getting the US “off oil” by 2040 as quite possible and a recipe for strengthening its economy. Some companies are well on the way – STMicroelectronics aims for zero net emissions by 2010. DuPont has already cut emissions by 65% of 1990 levels. Generally it is cheaper to save fuel than to buy fuel, for example end use efficiency costs \$12 per barrel – so much cheaper partly because of distribution losses. He foresees cars and trucks being made radically lighter from different materials. He suggests that logging wastes can be used to produce ethanol thus not using extra land nor replacing rainforest with oil palm plantations for biofuels. The US currently has an illegal import tariff on Brazilian ethanol from sugar cane. Brazil has already replaced 26% of its petrol with ethanol.

Lovins suggests that distributed systems where micropower generation is close to demand will be part of the answer and that the grid should be a smarter web that can handle variations in wind/solar/hydro rather than its current hierarchical large generation plant model.

Regarding the increasing demand for energy from developing countries, he notes that building an oil-frugal or even an oil-free economy from scratch is easier than converting an oil economy to kick the habit. *“Superefficient energy use, built in the first time, actually reduces the capital cost of many buildings and industrial processes; non-oil supplies suffer less hard-currency outflow and price volatility; and the high capital intensity of oil-related supply investments is avoided. It's gratifying that many developing countries are eager to progress past the oil trap without falling in, and disappointing that bilateral and multilateral aid and advice efforts are doing so little to help them execute this emerging strategy. The opportunity is unprecedented; the prize is vast; the time is short. China's mid-2004 energy strategy, making efficient use*

the top national priority is an act of farsighted leadership that we hope others, in both the developing and developed worlds, will emulate.” - Excerpt from www.oilendgame.com - his suggested strategy for reducing oil dependence and decreasing energy intensity.

One of the most interesting and inspiring speakers on urban sustainability was **Ngarimu Blair** from Ngati Whatua o Orakei. He is a heritage and urban planner. It is a completely urban iwi. Tamaki Makauru has a history of a thousand years of Maori occupation and use. Maungakiekie (One Tree Hill) is the largest man-made fortress in the southern hemisphere. He outlined the marginalisation of its people, alienation of the land, burial grounds concreted over and Tamaki Drive effectively severing the remaining community from the Waitemata harbour. A sewage pipe, eight foot high and blocking access to the beach, came from the CBD to pump sewage into the sea by the last piece of Maori land. In Auckland, Ngāti Whātua was left only with land at Ōkahu Bay, and in 1951–52 their houses there were demolished. The occupation of Bastion Point became a turning point for Ngati Whatua.

Ngarimu described the ongoing planning for land returned in 1991 and how knowledge of the past can positively influence future development. The iwi was determined not to create a settlement indistinguishable from the rich suburbs clothing all the land nearby. The ancient terracing around the pa would be recreated in modern medium density housing that reflected both a desire to live in connected whanau groups and also sound ecological design. Te Aho ki Hikurangi will be a sustainable village, moving away from traditional subdivision practices to on-site water management, including rejection of the use of Waikato River water. They used aerial photos of the original fortifications to tell where buildings should go with minimal “cut and fill”. They aim to bring back their language and particular styles of art, haka and waiata, include retail developments and have well planted open space.

The iwi’s plan to harness appropriate C21st technology while returning to lost values of kaitiakitanga was encouraging. Perhaps Wellington can work with local iwi to enhance the sense of place and ensure some distinctive and sustainable architecture.

Global Learning and Observations to Benefit the Environment (GLOBE) is a worldwide network of students, teachers, and scientists working together to study and understand the global environment. It is implemented internationally through bilateral arrangements between the United States government and the governments of partner nations. It was initiated in the United States in 1994 by the then Vice-President, Al Gore.

New Zealand's participation in the GLOBE programme was formalised on 29 February 2000, at a ceremony at Hutt Intermediate School, when the Minister of Education, Trevor Mallard, signed an arrangement with the then Ambassador of the United States, Carol Moseley Braun.

Schools use GPS technology and measure pH, do soil sampling, quadrants, transects and temperature readings among other measurements. The key is that they are spatially keyed. Comparisons can be made between schools, latitudes and catchments.

Kathryn Hicks and Aaron Fleming of the Royal Society of New Zealand recently assumed management of the New Zealand GLOBE Program. EMAP combines GLOBE with the National Waterways Project, which provides access to water quality monitoring activities for rivers, streams and other fresh water systems. Since its inception in 2000, this project has evolved from providing curriculum support for simple monitoring of waterway quality to consideration of data collected and taking action to enhance the water quality based on these results. The combined delivery of the GLOBE Program and the National Waterways Project provides a new delivery of environmental education in New Zealand and continues to encourage environmentally sustainable practice, reminding students that they can make a difference to the world we live in.

START attracted considerable attention – the regional planning initiative looking at the challenges ahead for a sustainable region. START (Sustaining the Auckland Region Together) is a collaborative programme between the eight local authorities in the Auckland region and central government agencies. The programme is also drawing on considerable expertise from the business, community and research sectors. It seemed to have included more charettes and youth participation than our WRS but maybe we can learn from that. It was reporting on issues to the Regional Growth Forum so seemed to be integrating problems of resource availability and climate change with planning for growth.

The IUPS Physiome Project

The Physiome Project is a worldwide public domain effort to provide a computational framework for understanding human and other species' physiology. It aims to develop models at all levels of biological organisation, from genes to the whole organism. We saw some modeling of cardiovascular systems. The University of Auckland is a key participant. See www.physiome.org.nz

The **Twin Streams** project was marvellous for involving people in catchment management and a major stormwater programme. See <http://www.waitakere.govt.nz/Abtcit/ne/twinstreams.asp>

5. General Points

The general impression from the scientific community was of huge continued global pressure on freshwater, oil, food and biodiversity. The parallel from the IT community was “how interesting, let's model it so we can watch the Earth and its processes in virtual reality”. While oversimplifying, it does seem that we know what the problems are and if the solutions are currently politically unpalatable such as waste minimisation, water conservation, reduction of greenhouse gases and decreasing human impact in general, these will not be made any sweeter by having computer models showing exactly how each loss

pans out. The best hope is for an intermediate level of technology that enables the widest number of concerned people to be informed and disseminate the current local and global situation.

The presence of Chinese and Japanese scientists showed the commitment of some sectors in these countries to futures thinking. The Japanese computer effort to create an Earth simulator seemed amazing but possibly tragic in that it may just show us the virtual equivalent of our imminent collapse without offering alternatives. Its success will depend on whether the modelling can show which actions are most effective.

One speaker was calling for significant investment in a non-commercial alternative to the Google systems – search engines and the relatively recent Google Earth. He suggested that teams of experts in different areas would add and sift information to be a more academically rigorous version of Wikipedia that was geographically based. However this seemed to me an unnecessary diversion of money – it's not difficult to ignore the ads on Google and there's no guarantee that the teams of experts couldn't also suppress particular worldviews in their chosen area. I thought I preferred the apparently "open to all" Google communities, constantly expanding Wikipedia that can be challenged and discussed with different views, national encyclopaedias such as Te Ara www.teara.govt.nz, backed up by references to peer-reviewed articles in scientific journals rather than public investment in a censored alternative! However, certain topics can't be searched for on Google in some countries and certain websites are banned so it appears there is still considerable censorship.

The many youth delegates had an interesting effect on the overall conference and brought a youth voice to the three days. Their joint presentation of the issues and examination of how the World Rugby Cup in 2011 offered incentives to get Auckland sustainable were valuable. At one level, their thinking about attending the next Digital Earth conference didn't seem focussed on any changes in lifestyle or recognition of the inevitability of change but more on the excitement of going to San Francisco! However, the short film that was produced and shown demonstrated a broader awareness of sustainability issues and the role technology can play in maintaining a liveable future.

6. Issues for Staff to Consider Following Up

- 1. **GIS Day** – the international day is Nov 15th but due to NZ exams it's usually held here in August. We could work with Wellington 2020, local businesses such as CityLink, schools and our tertiary sector for 2007.*

Tauranga City Council

Tauranga City Council hosted 89 students from 5 schools at this year's GIS Day. The students were treated to a number of presentations that included – Stephen Lun on how GIS is used by Tauranga City Council on a daily basis and the systems used. This was followed by Garry Christofferson from Boffa Miskell on GIS from a consultancy perspective, showing how visual presentation is so important in illustrating to clients their proposals or presenting a case. Mark Thompson from Eagle Technology gave an interesting presentation of different

uses of GIS in the 'why/what if' category. Mark demonstrated mapping of the 'U2 Tour across USA, evacuation of a multistorey building by a number of people who move at different foot speed, and sniper protection for the President scenario. Stephen Lun gave a talk on TCC aerial photography and gave a demonstration using 3D tools –showing new developments of 'proposed' high-rise building at the Mount Maunganui. Jill Brightwell from TCC demonstrated the use of GPS and how it is used to keep a spatial inventory of reserve trees and furniture. This was the eighth annual event held by Tauranga City Council.

2. *GLOBE/EMAP could be investigated for use with Greater Wellington's monitoring and our Enviroschools.*

It may fit well with Project Kaiwharawhara and its extension to Porirua and Owhiro streams. Parks and Gardens staff are already considering how data about volunteer planting can be stored so site planning is most effective and no plants are destroyed through one part of Council not knowing of initiatives from the community. Special habitats could also be identified through the Biodiversity Action Plan but of course locations of very rare plant species should not be revealed too exactly. Using global systems means we don't have to create our own although there may be questions of interoperability.

3. *Staff could examine the comprehensiveness of e-democracy and e-community initiatives.*

Do these projects plan to consider the GIS information layers Wellington City Council holds and how it could be made more readily available? This is also highly relevant for local businesses. Making it accessible has been started by a project Rachel Ryan was contracted to perform. She was a recipient of one of the Creative Wellington Innovation Awards and through her endeavours, our aerial photos of Wellington have been uploaded to Google Earth so that Wellington is a clear site on the globe rather than appearing as a fuzzy and therefore low-tech area. Many people don't know they can access aerial photos of properties on the Wellington City website. Communication of access is very important. The interface between geographical location and events could expand the interest in feelinggreat.co.nz, our events site. Similarly, information about Council facilities, hours and costs, could be added to Google community layers for access by anyone.

4. *New modelling could be made available publicly.*

Some work has been done within the Urban Design area on 3D building data. For example, if WCC and city goals of greenhouse emission reduction are to be realised. Sunlight and terrain information could be combined to show where investment in solar water heaters would be best targeted. Already there are models of sun and shade at different times but these are not accessible by the public.

5. *Consider shared systems.*

Inevitably GIS and other ICT systems can be expensive. Whether we share systems or collaborate with other councils regionally or nationally, costs could be saved and interoperability improve with such co-operation.

6. *Consider making geographically based Asset Management Plans publicly available*

Recently there have been a few examples where an area of formal or informal volunteer planting has been adversely affected by operational level Council business units or Council contractors. Ensuring all such projects are recorded on our GIS could help avoid this. Detailed Asset Management Plans could be made available in a geographically linked way so that the public can find out what is due to happen where. The public sometimes complain that our voluminous reports aren't easy to find or search through. Looking at online maps of their suburbs for upcoming resource consents, road resurfacing or library opening hours might facilitate greater community engagement.

7. *Involve Youth in information systems planning.*

One of the strengths of the DE conference was the strong youth participation. They are more at ease with new technology than most councillors and many officers. Online visual connection offers new ways for people to interact with council, data and processes and youth are a key group who will access technology most easily. Their assistance may be required to help their families and colleagues keep up to date!

8. *Learn from Twin Streams Waitakere* when expanding on Project Kaiwharawhara and stormwater management issues

9. *Examine whether the START model* can contribute to making the Wellington Regional Strategy more truly sustainable.

7. Material for Circulation

All the presentations are at www.digitalearth.org.nz . This report covers a subset.

The Youth delegates worked together to produce a short film and website that will soon be able to be viewed at www.longsong.com

8. Benefit to Council/Elected Members

The areas of digital information and sustainability have not been considered together by Council's elected members so far. Familiarity with shared public information rather than reports kept by individual agencies could encourage more effective assessments of performance.

It certainly helped to see what digital tools are available and no doubt these will be useful. However, a message that some were peddling was that we need more information before we begin to address environmental problems. This seemed to me to be unnecessary for at least getting started on actions such as reducing soil erosion, protecting existing wetlands and reducing fuel emissions. Our current models have significant limitations e.g. traffic modelling fails to enable input of increasing the numbers of school walking school buses and calculating

the consequential effect on peak-time traffic although studies have shown a relationship elsewhere. The quality of models depends so much on what assumptions and objectives are implicit in their design that to say we need more complex modelling when we

The specialist sessions where short presentations were followed by questions and discussions provided useful opportunities to meet other people interested in solution-oriented use of technology.

It would have been even better to have had some Council officers attending to integrate the different fields of knowledge.

GIS offers huge opportunity to integrate different strands of information – for example our corridors for increasing population density with the landforms and heritage present and the recreation opportunities, indoor and outdoor, that would be needed. I found it frustrating, but inevitable, that there are several competing systems of GIS. It certainly seemed an area where several Councils could co-operate to provide the fundamental support systems and public access to public information in a more cost-effective way. We need to explicitly balance free public access as an important tool compared to potential sale of packaged information to specific segments e.g. developers and as a city it may be more effective to have more information freely available to everyone - whether developers, students or environmental activists.

Public input on different urban renewal schemes or traffic calming could be more meaningful if good virtual reality scenarios were developed. A 3D walk-through could really help when many people find it difficult to visualise from a 2D plan. The University of Canterbury/Hitlab appears to be developing cheaper models – they certainly need to be a bit more realistic in detail and diversity than some “fly-through’s”.

Spending time at well-organised content-rich conferences is a great way to get a high level view of advances in area. Attending conferences, speaking with experts, discussing issues with councillors and officers from other parts of NZ and beyond, looking on the Internet and reading serious books about politics, urban issues and global situation are all important ways we can improve our understanding as city councillors able to see Wellington in a global context. This conference inspired me to consider new ways to work with local people to solve some of our local and global problems, to take opportunities and to be aware that the state of the world is changing extremely rapidly in an interconnected system.

So, attendance at the conference was beneficial in that I saw some new possibilities which I have followed up and I hope staff and councillors will use the urls I provide to follow their own areas of responsibility further.

Report prepared by: *Councillor Wade-Brown*