

www.beehive.govt.nz/Print/PrintDocument.aspx?DocumentID=26919

Printed from <http://www.beehive.govt.nz>

Rt. Hon Helen Clark

28/08/2006

Digital Earth Summit on Sustainability

Welcome to our distinguished speakers and participants. Your commitment to a connected and sustainable world has brought you to our country.

I see from the Summit Programme that we have here a mix of very big picture thinkers, expert scientists with a global perspective, and leading edge thinkers in technology.

We have connections across culture, peoples, disciplines, sectors, and technologies in this auditorium today.

I was fascinated by the Al Gore film "An Inconvenient Truth" which I saw at the film festival in Wellington last month.

It's a sign of the effectiveness of Al Gore's crusade on global issues that his film is packing out movie theatres around the world and raising awareness about global warming.

The stimulus for the Digital Earth initiative also came from Al Gore. And so, people are drawn from all over the world to conferences and symposia like this one for discussions on sustainability, urban issues, and harnessing technology so that we can measure and forecast human activity better.

I know there is debate between those who think innovative technology will provide solutions, no matter what happens in the future, and those who don't. That debate needs to be had.

It is great to see ninety young New Zealanders here, engaging directly with issues which will be pivotal both to their lives and the lives of future generations.

It was Einstein who once said: "We can't solve problems by using the same kind of thinking we used when we created them." Our hope may well lie in the innovative and lateral thinking of young people being set alongside the wisdom of those who have devoted a long lifetime to study of the issues.

This planet is the home which all of us share. This is the only place we can call home. Future generations call to us to care for and nurture the people and the places of this planet.

The Digital Earth Summit is timely. There is a growing feeling that we are at an important cross roads of our planet's history.

We are facing very challenging global issues, from the threat of change to our ecosystem, to a reduction in our biodiversity, the fast depletion of finite resources, and the rise of so many mega cities. Integrated data management can help us meet those challenges.

The Summit website refers to the Digital Earth initiative as a 'digital commons...a vast digital marketplace where citizens can access informational services... to understand the complex interaction between humanity's economic, social and cultural activities and our environment'.

Access to good information plays a key role in overcoming uncertainty and is fundamental to democratic decision making.

It is the responsibility of all of us to take collective action which will over time make a difference. Through science and technology, connecting globally and working collaboratively, we now have the ability to lift our thinking to a new level.

As stated in the Summit brochure, 'emerging technologies are enabling vast amounts of otherwise disparate data to be integrated to give us a much deeper understanding of our world, our environment and our communities This in turn allows us to make the decisions

MI

necessary to maximise the utility of resources and increase the sustainability of all our enterprises'.

The themes of these three days are important. I understand that you will hear:

- A reinforcement from speakers of the urgency of global concerns and how they might impact on New Zealand
- From others, the need to plan for both what we know, and for the level of uncertainty which remains, and to take practical action to manage the risks
- And from others, the importance of good quality integrated information, so that we can predict and manage risks such as the threat of weather extremities, sea level rise, and epidemics.

This summit brings together all these elements to give practical application to the concept of a virtual Earth.

Sustainable Development Programme of Action

I attended the World Summit on Sustainable Development in Johannesburg in 2002 and returned with a determination to make sustainable development meaningful in the New Zealand context.

Our Government identified four areas for action under a Sustainable Development Programme of Action:

- Energy
- Quality and allocation of fresh water
- Investing in child and youth development and
- Sustainable cities.

Our Sustainable Development Programme of Action established a set of guiding principles to define what government meant by 'sustainable development'.

Those principles direct us to consider: the long term implications of policy; innovative solutions; best information; risks, uncertainties and precaution; partnerships; transparency and participation; global perspectives; decoupling growth and environmental pressures; respecting environmental limits; partnering with Māori and empowering Māori development; and respecting human rights, law, and cultural diversity – all elements that are at the core of the agenda of this Summit.

A recent workshop sponsored by my own Department of Prime Minister and Cabinet suggested that these principles continue to be well received and applied.

The need to be applied through partnerships, which are becoming an established way of doing government business in New Zealand. In the 21st century governments cannot achieve their objectives without close collaboration and networking with stakeholders across the economy and society.

The relationship between central and local government is very important, which is why we meet at the highest levels of both in the central – local government forum every six months.

Working relationships with industry and business are important, and we appreciate the good relationship we have with groups like the New Zealand Business Council for Sustainable Development.

We need whole of government and New Zealand Incorporated approaches to sustainable development. No one actor has the magic wand. Our strength will lie in unity of purpose and a determination to work together.

Sustainability is now a key underlying principle in many areas of government policy.

It is inherent in the land transport legislation passed in 2003, and in the Local Government Act 2003.

Arising from the Local Government Act, councils all over New Zealand have just drawn up Long Term Council Community Plans, planning for the economic, social, and cultural wellbeing of their communities.

M2

Arising from the Sustainable Development Programme of Action, a 'New Zealand Energy Strategy' is now in development with a focus on renewables and sustainability.

Intense work is being done on how to manage water allocation and conservation better.

We have committed to the Kyoto Protocol and to taking steps to reduce our greenhouse gas emissions over time. A comprehensive programme with fresh initiatives for forestry, land use, and transport is being developed.

As part of the Sustainable Development Programme of Action, we focused attention on our cities and quality urban design. Over 87 per cent of New Zealanders live in an urban environment, and we want our cities and towns to function well.

A lot of attention is being paid to how Auckland functions – or doesn't. It is our only metropolis of scale, and has long suffered from inadequate forward thinking, leaving it in the course of the last decade or so with traffic gridlock, water shortage, and power disruption.

Now local leadership is emerging determined to make a difference, and central government is engaging with it to find solutions and enable Auckland to reach its full potential.

Overall, I believe we are making significant strides towards sustainability in New Zealand.

The Resource Management Act of 1991 made us think about the environmental and social impacts of our actions.

We have a progressive social agenda, and a commitment to a cohesive society where all can reach their potential.

We have initiated significant steps towards reconciliation with Māori as the indigenous people of our country, as well as emphasising inclusion of the many migrant peoples who settle here.

Our goal of economic transformation is underpinned by a strong awareness of the need for environmental and social sustainability too.

Digital strategy

New Zealand last year launched a nationwide Digital Strategy. We know that technology and good quality integrated information systems are the key to making sound decisions.

If we are able to manage our resources wisely from now on and build on modern technology and innovation, we will be able to forge a path which will enable New Zealanders to maintain our high quality of life.

Information and social engagement are key to that.

Working collaboratively, across central government, local government, business, and non-governmental organisations, we can build a sustainable future for New Zealand.

The place we can look to learn how to be a global community, is in our own community.

The school, the marae, the workplace, the council chamber, the country hall, - are all places where we can learn how to work together as a community. Increasingly, the way we find out about what is going on in our neighbourhood, our catchment, our city is by digital means.

We need to break down information silos, build our capacity in and our access to technology, and make sure that the data available across sectors and communities is compatible, and that the whole is more than the sum of the parts.

New Zealand is a small country on a small planet. It may be argued that digital technologies are taking over from oil-based technologies as the factor which is shrinking the distance between us.

Our Digital Strategy focuses on content, connectivity, and confidence as the core of creating a digital future for all New Zealanders - a world where we can find what we need to know to manage our individual, community, and national well being, have open access to that knowledge, and have the confidence to use it.

The use of digital tools and information to inform sustainable development is becoming the

M3

reality for New Zealand.

For example, in the environment sector, New Zealand is focused on how technology, and the data it provides, can best be applied to sustainability.

Not only are we one of the most internet connected countries in the world (788 internet users per 1000 people in 2004), but we have led the way internationally with the development of new digital ecosystem mapping techniques, called environment classifications.

The recently developed Land Environments New Zealand, River and Marine Environment Classifications, (known by their acronyms LENZ, REC, and MEC) can be put to use by people who work in conservation, farming, forestry, horticulture, public health, fishing and resource management.

They are powerful digital resource management tools.

They allow us to see where similar ecosystems are across New Zealand – from our mountains into our oceans.

We can use that information to make sound management decisions.

For example, at a regional level we can use digital climate, soils, and landform data from the Land Environment NZ classification to find areas suitable for high value crops.

This is an exciting prospect when we consider sustainable development and the opportunities in New Zealand for regional development. LENZ can also be applied to biodiversity management and even biosecurity.

The River Environment Classification organises and maps digital information about the physical characteristics of New Zealand's rivers.

It is currently being used by a range of agencies including central and local government for different freshwater management purposes.

These include environmental assessments, policy development and environmental monitoring and reporting.

The Marine Environment Classification organises and maps digital information about the physical and biological characteristics of New Zealand's oceans (across our Exclusive Economic Zone).

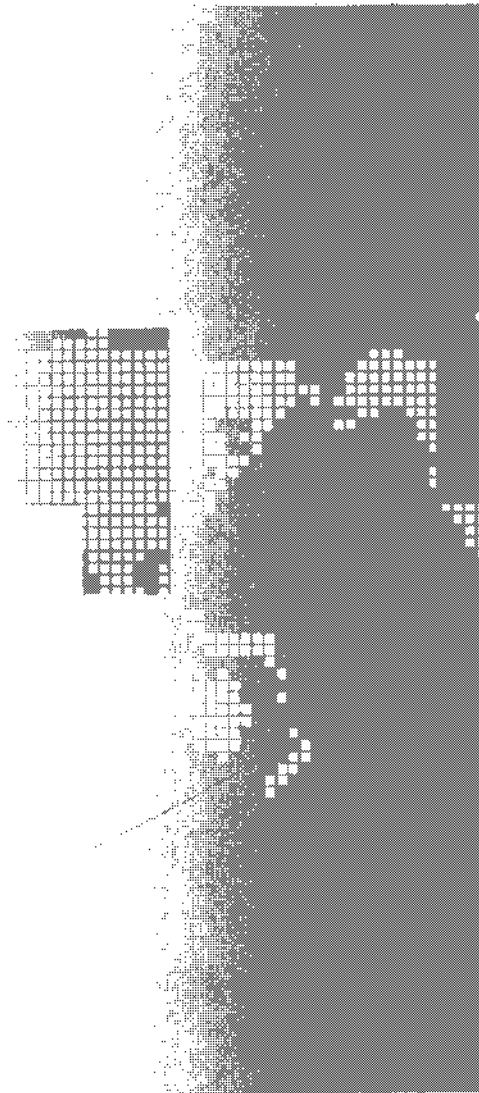
It is currently being used by a range of agencies including central and local government and the fishing industry for environmental assessments, policy development and environmental monitoring and reporting.

Internationally these classifications represent a significant achievement in the development and use of digital tools by New Zealand for sustainable development.

Using tools like these with other digital data and information we can look to our past, analyse our current situation, and plan for a sustainable future.

My best wishes for this Summit. May you engage, may you learn, and may you connect with one another. It is my pleasure now to declare the Summit open.

M4



digital earth
summit on sustainable
06



MS



Digital Earth and the 2006 New Zealand Summit on Sustainability.

At the 4th International Symposium on Digital Earth in Tokyo, the International Society for Digital Earth, agreed to conduct a special summit on the application of technology to sustainability to be held in Auckland, New Zealand in 2006.

The Summit, to be held between 27th to 30th August, will bring together the leading international thinkers in technology, innovation and sustainability who are working to protect our earth and minimise waste of our increasingly scarce natural resources.

The Digital Earth '06 Summit on Sustainability will assist industry, government, research and IT leaders to appreciate how the mountains of valuable data about our environment which currently languish in 'silo's' can be better utilised in our quest for environmental sustainability.

Furthermore, the Auckland Summit will serve as a substantive preparatory meeting for input to the 5th International Symposium on Digital Earth to be convened in 2007 in North America.

All members and supporters of the International Society for Digital Earth are encouraged to become sponsors of the Summit.

Mayoral Office
Auckland City Council
27th August 2006

Dear delegate,

A very warm welcome to Auckland City.

We are proud to host this important Summit. These next days may well be the tipping point in our journey towards a more sustainable future for our cities, our regions and our country.

The implications of a changing global environment and the important role that cities can play, are beginning to be understood. We will need all the wisdom and creativity we can muster to be able to adapt and manage risk. I am confident that the speakers that you will hear, both international and local, will provide the stimulation and the room for reflection on these hugely important issues. From the dialogue and discussion that will follow, we will need to forge our own unique path.

Sophisticated tools such as Digital Earth can help communicate, predict and manage more comprehensively. Planning for uncertainty will require a good integrated information base. It will require us to break down the silos, to collaborate, to connect information and connect with each other in order to take sensible steps to prepare ourselves for the future. We are a small country, we have stunning natural assets and low density, comparatively speaking. If any country can adapt and prepare for the future, we can.

It will need all of us in all the different parts of society, as individuals and in our agencies - local, regional and central government, business, CRIs, tertiary institutes, NGOs and iwi/Maori organisations, all working together to rethink the way we do our day-to-day business on the earth.

I do not have a gloom and doom attitude. I believe we have a real chance to plan sensibly and strategically. This Summit provides the time and space for us to look tactically at our next steps, where we need to invest, what needs to shift in our budgets, and what changes we need to make to plan for uncertainty.

My very best wishes to each and every one of you,



Dick Hubbard
Mayor
Auckland City Council

welcome to the delegates



Sunday - August 27

9.00pm Powhiri - Town Hall
6.30pm Civic Reception - Town Hall: host Dick Hubbard and Councillors

Day 1 - Monday - August 28

8.30 - 9.00am: The Rt. Hon. Helen Clark, Prime Minister of New Zealand
Global & Local Challenges - Chair - Prof Guo Huadong

9.00 - 9.30am: Dr Tim Foresman - Sustainability and Digital Earth: Looking forward from the past
9.30 - 10.00am: James Kunstler - The Long Emergency

10.00 - 10.30am **Morning tea** (trade displays, book stall and book signing available with James Kunstler)
10.30 - 11.30am: A real time interactive video link to Amory Lovins - Profitable Climate Change
11.30 - 12.00pm: Ann Magee - Remaking New Zealand Cities - Can the Auckland Region be a Sustainable Model?
12.00 - 12.30pm: Dr Morgan Williams - Knowledge to navigate to a more environmentally sustainable future: but what knowledge?
12.30 - 1.00pm: Prof Guo Huadong - Mission of Digital Earth and Digital Earth Prototype System

1.00 - 2.00pm **Lunch** (James Kunstler available for questions)

2.00 - 5.00pm **SPECIALIST SYMPOSIA**

1) Education and Life Long Learning for Sustainable Development
2.00 - 2.25pm: Aaron Fleming - Environmentally Sustainable Futures using GLOBE as a digital tool
2.25 - 2.50pm: Jonny Chilcott, Helen Haslam - Community Stewardship for Healthy Streams & Strong Communities: how we are making a difference?
2.50 - 3.15pm: David Wortley - Interactive Mapping and Sustainable Communities

Afternoon Tea
3.15 - 3.45pm: John Hattie - A New Zealand solution to dealing with the overload of digital data when assessing students
3.45 - 4.10pm: Q&A - Workshop discussion around key questions for future progress
4.10 - 5.00pm:

2) Food & Production
2.00 - 2.25pm: Richard Whatman - Managing "Govmercial" data; 'commons' that defy public/private divides
2.25 - 2.50pm: Richard Lynch - Digital Data - A user's perspective
2.50 - 3.15pm: Carolyn Hedley - Precision Agriculture-digital technology for improved sustainable farming

Afternoon Tea
3.15 - 3.45pm: Q&A - Workshop discussion around key questions for future progress
3.45 - 4.30pm:

3) Natural Hazards
2.00 - 2.25pm: Jim Salinger - Climate change hazards impacts on New Zealand
2.25 - 2.50pm: Gavin Treadgold - Sahana - Working towards a sustainable ICT solution for disaster management
2.50 - 3.15pm: Geoff Clithorne - The GeoNet Project - Monitoring geological hazards in New Zealand

Afternoon Tea
3.15 - 3.45pm: Q&A - Workshop discussion around key questions for future progress
3.45 - 4.30pm:

4) Scenario for a Sustainable Region - using a case study of the Auckland Region (START)
2.00 - 5.00pm: Megan Howell, Alan Johnson.

5) The Youth Voice: Linking Sport and Sustainability: Visioning for the Rugby World Cup 2011
2.00 - 5.00pm: Carl Cheney, Ben Irving and Louis Brown - Digital Earth Youth Voice Team
5.00pm: Cocktails
6.00pm: Home host or free evening

Day 1

M19

Day 2 - Tuesday - August 29

8.30 - 9.00am	National Perspective - Chair - Hon. David Cunliffe
9.00 - 9.30am	Ngarimu Blair
9.30 - 10.15am	Sebastian Moffatt - Planning for Uncertainty
10.15 - 11.00am	Prof Tetsuya Sato - How can the Earth Simulator scientifically contribute to Sustainability?
11.00 - 11.30am	Morning Tea
11.30 - 12.15pm	Prof Hans Schreier - A multi-barrier approach to water management in watersheds
12.15 - 12.30pm	Joe Fimage - Transforming the "Information Envelope"
12.50 - 1.00pm	Hon. Trevor Mallard
1.00 - 2.00pm	Lunch (trade displays and display of electric and foldable bikes)
2.00 - 5.00pm	SPECIALIST SYMPOSIA
	1a) Health
1.45 - 2.10pm	Peter Hunter - The Physiome Project with Applications to Healthcare
	1b) Land and Ecosystem Management
2.10 - 2.30pm	Prof Li Daren - Generalised and specialised spatial information grid
2.30 - 2.50pm	David Palmer - Portals: an open door to smarter use of science data
2.50 - 3.15pm	Joseph Strohle - Planning for Sustainable Energy Supplies
3.15 - 3.45pm	Afternoon Tea
3.45 - 4.10pm	Kirsty Johnson - Digital Tools and information for better environmental policy and improved decision-making
4.35 - 5.15pm	Q&A - Workshop discussion around key questions for future progress
	2) Urban Development and Infrastructure
2.00 - 2.25pm	Dushko Boganovich - Eco-tech Design: The Smart and the Green
2.25 - 2.50pm	Nick Collins and Darren Utting - Data sources, information and tools needed to measure the sustainability of the residential built environment including TUSC as an example
2.50 - 3.15pm	Lindsay Gow - Information Needs and Urban Decision Making
3.15 - 3.45pm	Afternoon Tea
3.45 - 4.10pm	Hans Schreier - Virtual Water and the Water Footprint
4.10 - 5.00pm	Q&A - Workshop discussion around key questions for future progress
	3) Design and Communication
2.00 - 2.25pm	Bob Frame - The notion of sustainable consumption - Can you have your cake and eat it too?
2.25 - 2.50pm	Garry Christofferson - Information driven design
2.50 - 3.15pm	Edgar Rodriguez - User's Behaviour and Design Solutions: Reducing Environmental Impact
3.15 - 3.45pm	Afternoon Tea
3.45 - 4.10pm	Emma McConachy and Carthew Neal - Greening the Screen: walking the talk to walk the talk
4.10 - 5.00pm	Q&A - Workshop discussion around key questions for future progress
	4) START: Youth Envisioning the Future
2.00 - 5.00pm	Auckland Regional Council and the Digital Earth Youth Voice Team
6.00pm	Cocktails
7.00pm	Gala dinner with guest speaker Martin Hill

day 2

Day 3 - Wednesday - August 30

8.30 - 9.00am: Technology and Solutions - Chair - Mayor Bob Harvey
9.00 - 9.45am: Prof Ian Downman - Earth Observation for Sustainability
9.45 - 10.30am: Prof John Townshend - Monitoring forests in the context of a sustainable Earth
10.30 - 11.00am
11.00 - 11.30am: Dr David Penman - Biodiversity: A Model for Global Information Management
11.30 - 12.00pm: Dr Manfred Ehlers - Global Information Trends
12.00 - 12.30pm: Tim Brown - Infratil - A long-term investor perspective on "Inconvenient Truth"
12.30 - 1.00pm
Lunch

1.00 - 4.00pm

WHERE TO FROM HERE?

This will include:

- The main soundbites/messages from the keynote speakers
 - Suggestions from the Specialist Symposia
 - The "Vision for the Future" from the Youth Delegates
 - Richard Simpson to present the challenge for New Zealand and a place to start; "The Digital Auckland Initiative"
 - Tim Forsman on behalf of the ISDE, connections and linkages with the international digital community
- Conclusion followed by closing ceremony

4.00pm

Dr Tim Foresman

"Sustainability and Digital Earth: Looking forward from the past."

Perspectives on the need for sustainable living patterns for human have been developing over the past few centuries, with notable names like Malthus, Thoreau, and Ghandi to provide cautions towards unrestrained economic development proponents. Beginning in the early 1970s, a new focus on the integrated elements of environment and social/economic well-being was placed upon the international stage and given greater academic and policy credence. Unfortunately, by the 2002 World Summit in Johannesburg, it became evident that governments no longer served the leadership roles that were expected of them, and that a new paradigm was needed to garner the collaboration of industry, NGOs, academics, in concert with active citizens to work with governments in partnerships. At the same time, the increasing prowess of Digital Earth technologies are enabling unprecedented capacity for mapping, measuring, and monitoring our environmental resources as well as to fine tune our understanding of the implications of our social and economic policies and actions. It is this juncture of our societal journey that we find ourselves facing uncertainties of global change and population expansion.

James Kunstler

"The Long Emergency."

The last two hundred years have seen the greatest explosion of progress and wealth in the history of mankind. But the oil age is at an end. The depletion of nonrenewable fossil fuels is about to radically change life as we know it, and much sooner than we think. As a result of artificially cheap fossil-fuel energy we have developed global models of industry, commerce, food production, and finance that will collapse. The Long Emergency tells us just what to expect after we pass the tipping point of global peak oil production and the honeymoon of affordable energy is over, preparing us for economic, political, and social changes of an unimaginable scale.

Are we labouring under a Jiminy Cricket syndrome when we tell ourselves that alternative means of energy are just a few years away? Even once they are developed, will they ever be able to sustain us in the way that fossil fuels once did? What will happen when our current plagues of global warming, epidemic disease, and overpopulation collide to exacerbate the end of the oil age? Will the new global economy be able to persevere, or will we be forced to revert to the more agrarian, localized economy we once knew? Could corporations like Wal-Mart and McDonald's, built on the premise of cheap transportation, become a thing of the past?

keynote speakers

Amory Lovins

"Profitable Climate Change to NZ Digital Earth conference."

10.30am (NZ time) 28 Aug 2006 (by videoconference).

Climate change, largely human-caused, is an overwhelming scientific consensus. Yet even skeptics should pursue climate protection for profits, jobs, and competitive advantage, because saving fuel costs less than buying fuel. Every business that practices modern energy efficiency recognizes its handsome profits, but oddly, many policymakers don't.

About 42% of global CO₂ emissions come from burning oil, 40% from producing electricity. Both kinds of emissions are unnecessary and uneconomic. For example, a recent Pentagon co-sponsored study shows how to eliminate U.S. oil use by the 2040's, led by business for profit. Half the oil can be saved by redoubled end-use efficiency (including tripled-efficiency cars, trucks, and planes) at an average cost of US\$12 per barrel. Substituting saved natural gas and advanced biofuels for the rest costs US\$18/bbl. Thus eliminating U.S. oil use will cost about US\$15/bbl - one-fifth today's oil price.

Similarly, most electricity in industrial countries can be saved more cheaply than just operating existing thermal power stations. Low, or no-carbon decentralized generating technologies already produce a sixth of the world's electricity and a third of its new electricity. This market success is attributable to costs, financial risks, and reliability and security problems all more favourable than for central stations.

The required public policies don't include new energy taxes, subsidies, mandates, or other market distortions, but are technology-driven, business-led, and market-based. Their business logic is already leading to encouraging early steps in implementation. Similar analysis in New Zealand would probably yield broadly comparable results.

Ann Magee

"Remaking New Zealand Cities - Can the Auckland Region be a Sustainable Model."

The Auckland urban region faces challenges similar to other "developed" city regions internationally. The region is at a point where decisions taken in the next decade will determine how resilient the region will be to external (or internal) shocks such as climate change and oil supply changes within the lifetime of children being born now.

Internationally there are examples of bold initiatives to address such anticipated challenges and to plan for a future based on more efficient resource use with decreasing environmental impacts. The presentation draws contrasts between a business as usual future (Plan A) and a strategy (Plan B) which charts a pathway to a more resilient future for the Auckland region.

Dr Morgan Williams

"Knowledge to navigate to a more environmentally sustainable future; but what knowledge?"

Publicity material for this conference says - "Digital Earth aims to be a digital market place for people seeking to understand the complex interactions between humanity's economic, social and cultural activities and our environment". Yes, we simply have to understand our interactions WITH the biotic world if we are going to develop 21st century societies and economies that can operate within the limits of our natural capital. What information from what realms of human endeavour is now the most critical to increase our understanding, our eco-literacy? Will more information on the physical health of our rivers, seas, forests, and biodiversity generate the necessary changes in our behaviours? It is increasingly looking unlikely. As we have become increasingly insulated from our physical world. Most of us live in towns and cities; habitats that separate us from the many demands we put on our world's biological, hydrological, atmospheric and other systems. We put increasing reliance on innovative technologies to mitigate our environmental impacts - but as global climate change reveals that is becoming increasingly difficult. I will explore the knowledge arenas I consider essential to New Zealand's quest to become a more environmentally sustainable South Pacific nation. Drawing on a number of Parliamentary Commissioner for the Environment studies, I will discuss the importance of understanding our core values, how they relate to our economic goals, formal education objectives, some policy positions, and global markets for our dominant products - foods and fibres, and visitor experiences. I discuss ways forward in terms of emerging leadership, institutional models (NZ and abroad) and areas of great opportunity for New Zealand to forge more sustainable pathways to the future and in doing so, secure the future for our children's children.

Prof. Guo Huadong

"Mission of Digital Earth and Digital Earth Prototype System."

Institute of Remote Sensing Applications, Chinese Academy of Sciences.

P.O. Box 9718, Beijing 100101, China. Tel: 86-10-68597231. Fax: 86-10-64879740. Email: hdguo@cashq.ac.cn

Digital Earth is formed by integrating voluminous, multi-resolution, three dimensional and dynamic data of the earth in grid format. As we are living in the information era and knowledge based economy is changing the people's way of living quietly but dramatically, the future human development is closely related to digits and information in every possible sense. Therefore, it is reasonable to believe that Digital Earth is significantly important to sustainable development of human society, improvement of life quality and advancement of S&T. The mission of the newly born International Society for Digital Earth is to promote the development of Digital Earth in a sustainable way and will be a valuable endeavor of the world academic community to face the challenge we will be encountering. As a step to implement the Digital Earth, an effort of building a test-bed for the research and development on Digital Earth was made, which is named Digital Earth Prototype System (DEPS/CAS). The DEPS is composed of subsystems with data receiving, fast processing and grid computing, meta-data service, spatial information database, model base, map service and virtual reality. During the whole working procedure, from data acquisition to data analysis and display, all systems are compactly linked up to form the working platform of the Digital Earth. This system introduces the concept of Digital Earth, key technologies as well as its applications in crop growth monitoring, disaster monitoring, digital archaeology, environment management, and digital city etc., and demonstrates the huge developing potentials and its attractive prospects.

keynote speakers

Sebastian Moffatt

"Planning for Uncertainty."

It is a paradox of the modern era that at a time when decisions by humanity are having increasingly long-term impacts on global systems and future choices, time frames for decision-makers appear to be shrinking every year. Nowhere is this contradiction more stark than urban system design. Over the next decade the UN is predicting another 358 cities in excess of one million people. In the process we will witness an expenditure of trillions of dollars on urban infrastructure, the majority of which will be designed according to engineering paradigms from the late 19th century and short-term accounting procedures from the mid 20th. Will this be our heritage?

How quickly can urban regions adopt new timing tools and transform critical infrastructure systems? What urban design strategies are appropriate, given the deep uncertainty introduced by time horizons of 30 or 100 years? Can decision support systems help design teams to explore multiple plausible futures? Or manage the risk of an increasing frequency and diversity of shocks?

This presentation will explore these questions drawing upon lessons from four case studies of long-term system design: the QingPu District in Shanghai China, the three provinces of Northern Netherlands, Greater Vancouver in Canada, and the State of Goa in India. Sebastian Moffatt has worked closely with teams in each location continuously over the past three years, using a similar set of digital tools and methods. He will focus especially on the difficulty of integrating morphological and physiological models and the new role for risk management in urban ecological design.

Prof. Tetsuya Sato

"How can the Earth Simulator scientifically contribute to Sustainability?"

The Earth Simulator Centre / JAMSTEC.

By presenting some global high-quality climate change simulations carried out on the Earth Simulator, I will describe how the paradigm of simulation science has been changed from a supporting methodology of experiment (observation) and theory to the leading methodology of science, namely, the future world is no longer Science Fiction but "Science Reality". I will then foresee the world of 2020 when simulation is widely and trustfully used for finding a scientifically sound symbiotic relationship between environment and human - realisation of simulation culture.

Prof. Hans Schreier

"A multi-barrier approach to water management in watersheds."

Institute for Resources and Environment, University of British Columbia, Vancouver, Canada.

Climate change is emerging as a key factor in adding stress to an already critical water situation around the world. Extended floods, droughts, water scarcity and water pollution are the main issues that need to be addressed but the fragmented nature in which we manage water makes these problems more daunting. A major shift is needed in the planning and managing of water resources. How to do this in an integrated manner is a major challenge. We spend too much effort documenting the extent of water problems and not enough on innovative solutions. The presentation will focus on innovative ways of managing water that include headwater protection measures, watershed wide actions and end of pipe treatments. Changing land use practices, minimizing impervious surfaces, improving green water management, water harvesting, detaining rainfall and storm runoff on site, water demand management, allocating water for environmental services, and water reuse are just a few of the innovations that are needed. All these activities have to be integrated into a watershed framework and this is accomplished by changing the traditional governance approach. Examples will be provided to show that a multi-barrier approach is the only effective way in which we can arrive at a sustainable use of water resources.

Joe Firmage

"Transforming the Information Envelope."

The Digital Earth project is the first front in a larger effort to transform the "information envelope" surrounding the typical world citizen. Today's information envelope is dominated by media companies, which have no ultimate objective other than to maximize the profit from traffic to their destinations. This has the inevitable consequence of reducing the visibility and accessibility of information vital to the survival of humanity and the natural Earth. Mr. Firmage will present and demonstrate a vision of how a new, non-commercial internet medium can offer a far more engaging, stimulating and truthful interface through which people can navigate the billions of information channels now exploding around them.

keynote speakers

Prof. Ian Dowman

"Earth Observation for Sustainability."

High level international summits, from UNISPACE III through the World Summit on Sustainable Development (WSSD) and the Earth Observation Summits have emphasised the need for the use of Earth Observation Technologies, to paraphrase the words of the Implementation plan from WSSD: "... to promote and develop the wider use of Earth observation technologies, including satellite remote sensing, global mapping and geographical information systems, to collect quality data on environmental impacts, land use and land use changes...". This paper will review the developments since UNISPACE III in 1999 in the areas of sensor technology, data processing and distribution, applications and also the political initiatives. The Global Earth Observation System of Systems, being implemented by the Group on Earth Observations (GEO), will be used as a focus for this review. It will be demonstrated that whilst technology has advanced at a fairly rapid rate, there are many gaps in the provision of a system which is available to all users, in all parts of the world, and which provides comprehensive data sets to satisfy all user requirements. There is an urgent need for capacity building, which will provide a spatial data infrastructure, which can distribute data and information, which can be applied by the end user for the benefit of his or her society; and for training to ensure the efficient and effective use of the information. This requires commitment at all levels of society, not least by government.

Prof. John Townshend

"Monitoring Forests in the Context of a Sustainable Earth."

University of Maryland, USA .

The world's vegetation is changing rapidly due to climate change and rising demand for natural resources. The need for reliable information on forests has never been stronger. They play a major role in climate change through their impact on the carbon cycle both through sequestration and through release of CO₂ especially during forest fires. Forests also often are locations of high biodiversity. They help reduce floods, supply drinking water and prevent erosion. Forests are themselves key natural resources in developing and developed countries. Remote sensing using satellites has added greatly to our knowledge of the location and pace of change, but we remain surprisingly ignorant about many aspects of forest dynamics. The role of remote sensing will be illustrated using examples from throughout the world.

There remain many challenges in ensuring long-term operational monitoring. These are largely non-technical and principally relate to long-term funding commitments and ensuring appropriate distribution of products. Of crucial importance in increasing the uptake of remote sensing data is eliminating charging for data from government-funded satellites wherever possible. This would help most users and also would help stimulate the service-providers relying on remote sensing.

Dr David Penman

"Biodiversity: A Model for Global Information Management."

College of Science, University of Canterbury, Christchurch, New Zealand. Email: david.penman@canterbury.ac.nz

The world is rich in information and its embedded knowledge but missing is a great depth of understanding. Knowledge of life on earth is case in point where information on the globe's 1.8 million known species is dissipated across many institutions and countries. Much of the information is legacy data collected well before the digital revolution yet a species name is the means to unlock many genetic, functional, ecological and behavioral information layers. The challenge was to liberate such data yet maintain ownership and control with the custodians of the information and to take advantage of web and other information technology developments. From this challenge was born the Global Biodiversity Information Facility (GBIF) and this paper will use GBIF as a case study to show data can be widely and freely disseminated for the benefit of all. The paper will outline the establishment processes for GBIF and its subsequent structures and achievements, as a potential means to liberate other environmental information and develop new synthesis tools.

Dr Manfred Ehlers

"Global Information Trends."

IGF - Institute for Geoinformatics and Remote Sensing.

University of Osnabrueck, Seminarstr. 19 a/b, 49074 Osnabrueck, Germany. Email: mehlrs@igf.uni-osnabrueck.de

Geographic Information (GI) is seen more and more as an integral part of the modern information and communication society. Improved methods for data access and integration have accelerated this process. For applications such as large-scale mapping, urban information systems or digital city modeling, remotely sensed data of very high spatial resolution are required. Traditionally, aerial photography was used as standard imaging input. The advent of the new satellites with a resolution of better than 1m and digital airborne scanner sensors with a high geometric fidelity and spatial resolution in the cm range, however, challenges the analog airphoto techniques. These new digital airborne and spaceborne high resolution sensors offer an advanced potential for generating and updating GI databases especially in the context of geospatial data infrastructures (GSDI) and for three-dimensional analyses such as cybercity modeling, urban climate analysis or emergency routing.

These developments have overcome one of the impediments of a global information society: the scarcity of accurate and up-to-date information. To some degree, we experience the shift to an abundance of information, which in return produces the next impediment: the user is overwhelmed by the oversupply of information. The presentation will address some of the ongoing initiatives with emphasis on Europe (INSPIRE, GMES) and Germany. Impediments such as data privacy rights or governments' 'closed shop' mentality will be addressed. An example for a local small-scale GSDI for a University will demonstrate the usefulness for small and medium enterprises and the necessity to incorporate the third dimension.

keynote speakers

Tim Brown

"A long-term investor perspective on "Inconvenient Truth."

Infratil is New Zealand's leading infrastructure investment company. Infrastructure forms part of a society's fabric and what is expected of it will change as social attitudes change. Electricity generated by burning coal gives way to renewable generation with growing social pressure to cost emissions. Building new roads gives way to public transport when the relative personal and social costs of private versus public transport become apparent. Investing in very long-term infrastructure assets means positioning for such social changes and this is a core part of Infratil's investment model. Infratil made significant investments in renewable energy generation a decade ago and has benefited, on behalf of its 25,000 NZ share and bond holders, from the subsequent social change which has made coal and gas fired power more expensive and hydro and wind stations more valuable. Last year Infratil acquired the NZ public transport operations of the multinational Stagecoach. It did so in expectation of renewed interest in "catching the bus" after several decades where the private car has eclipsed all other modes of transport. It sounds simple, but betwixt cup and lip is many a slip. Government has signed Kyoto, but MMP has deprived it of the CO2 tax regime and we are still waiting on "Plan B". Government has stipulated that it wants public transport patronage to grow markedly over the next decade, but the policy environment is confused and confusing and is not yet orientated towards delivering Government's target outcome. Successful investment is about maximising the value of opportunities and minimising risk. In industries with high levels of interaction with government (whether as regulator or funder) risk of policy change or implementation failure is very apparent. Infratil's approach to minimising this risk is to engage in the debate to the fullest extent possible. The goal is a win/win outcome that will be durable over the long run. The key is building trust.

Richard Simpson

"Digital Earth - A Role for New Zealand."

Auckland UniServices Ltd, University of Auckland, New Zealand. Email: r.simpson@auckland.ac.nz

Digital Earth is characterised as a virtual representation of the planet, encompassing all its systems and forms, including human societies, manifested as a multi-dimensional, multi-scale, multi-temporal, and multi-layer information facility. Through Digital Earth a virtual body of understanding about places can be established as a "global commons" and made accessible for stewardship by humanity across the internet. This vast shared geo-referenced repository will provide a framework for supporting the four well-beings of sustainability - environmental, economic, social, and cultural. Evidence driven feedback will enable individuals to become acutely aware of the implications of their actions and their sustainable needs. Through the advancement of Digital Earth, the often rather loose notions of sustainability to evolve towards becoming a more accountable empirical discipline enabling a new human right - the right for access to information referencing the sustainability of places. Faced with the failures of more conventional top-down governance approaches towards sustainability, increasing global uncertainties, and the legacy of unsustainable practices and misconceptions; Digital Earth is becoming a critical initiative requiring greater international collaboration and national exemplars. New Zealand has a special role to play as a potential surrogate for Digital Earth.

