

# Urban Underground Space in a Changing World

Deciding on Better and Resilient Cities

**Tuesday 4 June 2013 – Geneva**



Your invitation  
to the 2013 ITA  
Global Perspective  
Open Session  
Geneva



ITA

**global**  
perspective

Geneva  
2013

# ITA Global Perspective Open Session 2013 – Geneva

Tuesday 4 June 2013 / Programme

## Deciding on Better and Resilient Cities

Opening	Third and final ITA Global Perspective Open Session
10.00	Hosted by Han Admiraal, Chairman ITACUS and Antonia Cornaro, Secretary-General ITACUS
	On decision making – Global Perspective Insight
10.10 – 11.00	Three international speakers provide us with their insight on how they work together with decision makers and public policy makers within their own fields of expertise.
10.10 – 10.25	<b>The UNISDR Resilient City Campaign</b> Margareta Wahlström – UN Special Representative for Disaster Reduction, UNISDR Office for Disaster Reduction, Geneva, Switzerland
10.25 – 10.40	<b>Are we asking too much of decision makers?</b> David Cadman – President ICLEI and former vice-mayor City of Vancouver, Canada
10.40 – 10.55	<b>Why is Hong Kong investing in large scale underground development and what is their strategy?</b> Samuel K. C. Ng – Chief Geotechnical Engineer/Planning, Civil Engineering and Development Department, Hong Kong
ITACUS Thought Share	<i>Our work with UNISDR and UN Habitat</i>
	On what you can do – Global Perspective Action
11.00 – 11.35	What can you do to influence decision making. Ranging from private to corporate initiatives, what are others doing and can this help us? Three innovative cases on how advocates are driving projects to make underground concepts a reality.
11.00 – 11.10	<b>Underground Space of the Greater Paris Region</b> [speaker to be announced] – AFTES, Paris, France
11.10 – 11.20	<b>Moving cargo underground using a dedicated system: Cargo sous terrain</b> Yvette Körber, Managing Partner, Cargo Tube AG, Zürich, Switzerland
11.20 – 11.30	<b>How we are shaping and making the LowLine</b> James Ramsey, architect RAAD Studio New York City, co-founder of the LowLine, NewYork, USA
ITACUS Thought Share	<i>Who are our Global Partners?</i>

## On moving forward – Global Perspective Conversation

11.35 – 12.25

A lively debate on how we can move forward. We will ask what we can learn from these examples. How can we bring the message across to decision makers and policy makers? What key issues need to be addressed to bring underground space planning into public policy? Written questions will be taken from the floor during the debate.

Taking part in the debate will be Margareta Wahlström, David Cadman, Shipra Narang Suri (Vice-President ISOCARP), James Ramsey

ITACUS Thought Share

*Our Road Map 2013- 2015*

*We will tell you about the advocacy work ITACUS is doing and what our future plans are.*

## On what we are going to do – Global Perspective Future

12.25 – 12.50

You've heard from ITACUS, now hear from our Global Partners how we will continue to work together.

Ross Vincent

President IFME International Federation for Municipal Engineering

Shipra Narang Suri

Vice-President ISOCARP International Society of City and Regional Planners

David Cadman

President ICLEI Local Governments for Sustainability

ITACUS Thought Share

*Our new vision and mission*

## On furthering the cause – Global Perspective Appeal

12.50 – 13.00

Presentation of the brand new video 'Why cities should know about underground space'. The video will be officially handed over to Margareta Wahlström as special gesture to further the cause of resilient cities.

Close of session

13.00

# ITA Global Perspective Open Session 2013 – Geneva

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Tuesday 4 June 2013 / Key Insight Speakers

## Margareta Wahlström

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UN Special Representative for Disaster Reduction, UNISDR Office for Disaster Reduction, Geneva, Switzerland

Margareta Wahlström (Sweden) has over 30 years of extensive national and international experience in humanitarian relief operations in disaster and conflict areas, and in institution-building to strengthen national capacity for disaster preparedness, response and for risk reduction. In November 2008, the United Nations Secretary-General Ban Ki-moon announced her appointment as the first Special Representative of the Secretary-General for Disaster Risk Reduction. Ms. Wahlström is based in Geneva and heads UNISDR, the United Nations Office for Disaster Risk Reduction. Ms. Wahlström has an academic background in economic history, political science, social anthropology, archaeology and philosophy of science. She speaks English, Swedish, French and Spanish.

## David Cadman

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President ICLEI and former vice-mayor City of Vancouver, Canada

David Cadman (Canada) is a Vancouver city councillor, first elected in 2002. Cadman was born in Montreal, Quebec and grew up in Toronto, Ontario. Cadman studied at the University of the South in Tennessee and Geneva in International Development. He later attended the Sorbonne and is fluent in French. Cadman worked for the Social Planning and Research Council of B.C. and the Greater Vancouver Regional District as a communications director. He later served as president of the Society Promoting Environmental Conservation. Since March 2007, Cadman is the President of the international organization, ICLEI - Local Governments for Sustainability.

## Samuel K. C. Ng

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Chief Geotechnical Engineer/Planning, Civil Engineering and Development Department, Hong Kong

Dr Sam Ng (Hong Kong) gained his PhD in Geology from the University of Alberta in Canada. He joined the Geotechnical Engineering Office of the Hong Kong Government in 1994. Prior to that, he practiced in the Cayman Islands and the United States. He is a Chief Geotechnical Engineer and heads the Planning Division, which focuses on geological survey, engineering geology, terrain evaluation and natural terrain related studies

## Yvette Körber

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### Managing Partner Cargo Tube

Yvette Körber (Switzerland) is project manager for Cargo Tube and part of the management team at Zeppelin construction equipment. Her background is in PR, business and economics. She has been in leading positions in Management, Sales, Marketing and Finance of various reputable Swiss companies in the construction industry.

## James Ramsey

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### Principal RAAD Studio & co-founder Lowline

James Ramsey (USA) is the principal of RAAD and the creator of the Lowline. James' experience in design began at Yale University, where he won a Bates Fellowship to study cathedral design in Europe. He then went to work as a satellite engineer for NASA, where he was a part of the team that created the Pluto Fast Flyby and the Cassini satellites. After his time at NASA, James gained large firm experience at DMSAS in Washington DC and small firm knowledge, upon relocating to New York, at the boutique outfit, Penny Yates Architects. While teaching design at the Parsons School of Design, James worked to put the pieces in place to start his own design practice in 2004. RAAD has since built over a hundred projects, both in NYC and across the country. James Ramsey is the inventor of the Remote Skylight and founder of RAADStuff.

## Also taking part are

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Jean-Michel Paumier (France), [honorary director of the RATP and member of the Economic, Social and Environmental Council of the Greater Paris Region.](#)

Shipra Narang Suri (India), [Vice President of the International Society of City and Regional Planners – ISOCARP.](#)

Ross Vincent (New Zealand), [President of the International Federation for Municipal Engineering – IFME.](#)

# The ITA Global Perspective Programme

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## Urban Underground Space in a Changing World

### Changing World – Major Challenges

The world today is facing many challenges. One of these is that the world's cities will need to accommodate 6 billion people by 2050. This is in 38 years' time. By 2050 it is estimated that 70% of the world's population will live in urban areas. This fact alone poses a major challenge for urban planners. Imagine the world's population now, all living in cities. This is what the figure of 70% in 2050 represents. Rapid urbanisation is one of the world's major challenges. Natural disasters and the changing climate are the second major challenge facing the world. The effects of climate change, notably as freak weather occurrences, are a recurring global phenomenon. This has enormous impact on mega cities. Earthquakes, tsunamis, major storms and flooding on a massive scale, are threatening the fabric of society and cause massive disruption. Cities need to learn to cope with this challenge and ask themselves how resilient they are to such events.

### How is the World Meeting these Challenges?

Both of the above challenges have been identified by the United Nations as major issues that require policies and action at a global level. UN Habitat is running the World Urban Campaign which has the theme 'Better City, Better Life'. The basis of this programme is not only to raise awareness but it is also a true call to action. It requires engaging the public at large, the civil society, the business sector, the research community and governments in a global movement. The campaign includes a vision of what sustainable urban development requires.

Sustainable urban development calls for resilient cities. This is one of the programme objectives of UNISDR, the International Strategy for Disaster Reduction. It asks cities to consider and prepare for natural disasters. It also asks cities to plan for these events. As cities face the task of climate change adaptation, creative thinking is required. Contemporary solutions no longer provide the answers.



We need to demonstrate that change is possible through the genius, creativity and audacity of people and decision-makers to make the wisest choices for our urban future. This is the essence of the World Urban Campaign.

**Joan Clos** – *United Nations Under-Secretary-General, Executive Director of UN-Habitat*

Lack of space calls for creative solutions - proposed Underground Science City, Singapore



# Taking up the challenge

## How ITACUS is furthering underground space

The second Open Session in Bangkok on Planning Better and Resilient Cities (2012) launched a series of events and activities for ITACUS. New contacts were made, presentations given, memorandums of understandings were signed. The outreach and advocacy programme is in full swing, resulting in greater awareness of the contributions underground space can make in coping with major challenges facing the world.

ITACUS further strengthened the ties with ISOCARP in 2012 by attending its Annual Congress in Perm, Russia in September 2012 at which a Memorandum of Understanding (MoU) was signed by ISOCARP President Ismael Fernández Mejía and ITACUS Chairman Han Admiraal that pledged the two organisations to continue their cooperation towards development of effective planning and construction of underground space. Founded in 1965 the Society has members in more than 80 countries retains formal consultative status with UNESCO, and is an NGO (non-governmental organisation) and professional partner of UN-Habitat and of the Council of Europe. During the congress a paper was presented by the ITACUS Chairman and Secretary General.

**Fast forward** - ITACUS opened the dialogue with planners at the annual ISOCARP congress, Perm, Russia





This followed the signing of a MoU in Helsinki in 2011 with the Global Perspective programme's partner organization IFME, the International Federation for Municipal Engineering. The MoU confirmed further cooperation with the IFME, which was formed more than 50 years ago and has more than 20 member nations. With the underground playing a substantial role in fulfilling the objectives of the Federation, to continue to improve the quality of public works and wider community services, a working cooperation with the ITA was evident.

To progress the Global Perspective agenda in Geneva, ITACUS is joined at the WTC2013 Open Session by ICLEI, the association of Local Governments for Sustainability. Formed in 1990 at the World Congress of Local Governments for a Sustainable Future at the United Nations in New York, the association has more than 1,220 local government members from 70 different countries and represents more than 570 million people. At the Open Session in Geneva, the two associations will address the issues that surround the processes for Deciding Better and Resilient Cities. The session will contribute the final segment of the three-year programme towards the targeted preparation of the Policy White Paper on the use of underground space for the development of resilient and sustainable cities that will be presented to the UN.



In June 2012 a delegation of ITACUS attended the International Forum on Urban Underground Space in St Petersburg, which was organized by the Russian Association of Underground Builders (AUB). The ITACUS Chairman, Vice Chairman and Secretary General held well received presentations. Subsequently the AUB became a member of ITACUS and a memorandum of understanding to this effect was signed in Singapore during the ACUUS congress in November 2012.

A well attended two-day training session on underground space, which was developed by ITACUS and organized through the ITACET Foundation was held preceding the ACUUS congress. Members of the Steering Board and committee members gave lectures during this well received training.

At the beginning of 2013, talks were held with UNISDR – the United Nations Office for Disaster Reduction. This resulted in the ITACUS Chairman and Secretary General giving a presentation at an Inter-Agency Meeting on Outer Space Activities in Geneva in March. The meeting was between UNISDR and the United Nations Coordination of Outer Space Activities. The presentation was titled From Outer Space to Underground Space and was received well by those attending.

Special award handed to ITACUS by Russian Association of Underground Builders, St. Petersburg, Russia



In April ITACUS took part in an Urban Planning Working Group of UNISDR in Barcelona and ITA joined the UNISDR Resilient Cities Campaign.

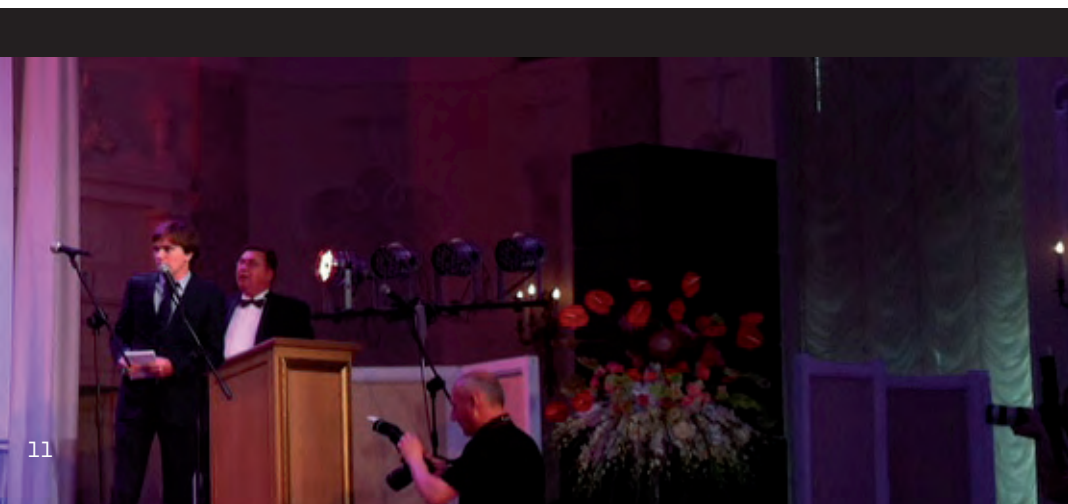
As part of the co-operation with ICLEI, the ITACUS Chairman presented and took part in a debate on underground logistical systems during ICLEI's Global Town Hall event during the Hannover Messe.

These activities highlight how ITACUS is advocating to include the concept of underground space into urban planning as part of meeting global challenges.

As a recognized NGO of the United Nations, the ITA, its Executive Council, its 68 Member Nations, its Working Groups and Committees, have given full support to the ITACUS Global Perspective agenda. Through the Global Perspective programme, ITACUS has harnessed the expertise and energy of its partner societies to pool resources, provide an integrated approach and ensure transfer and sharing of knowledge, expertise and experience.

Regular updates on the work ITACUS is doing can be found on the web pages at <http://itacus.ita-aites.org>

**and the work continues...**





# ITA global perspective

The ITA Global Perspective Programme is run on behalf of ITA by the ITA Committee on Underground Space – ITACUS. It consists of the following seven programme tracks.



To organise three concurrent ITA Open Sessions dealing with the key issues of planning, deciding and delivering sustainable urban development (2011-2013)

Achieved, with Open Session in Helsinki (2011), Bangkok (2012) and Geneva (2013).



To call to action ITA Working Groups, ITA committees and ITA Member Nations to join a global dialogue on how underground space can contribute to the major challenges the world is facing

In progress, the setting up of joint activity groups consisting of ITA WG members and ISOCARP members is under discussion. The Global Ambassador initiative will be furthered through the involvement of Member Nations at national level in the Global Conversation.



To reach out and develop continuous co-operation with the Global Partners: IFME, ISOCARP and ICLEI

Achieved, with an ongoing cooperation between itacus and IFME, ISOCARP and ICLEI.



To develop a policy document on how underground space can contribute to sustainable urban development for UN-Habitat and UNISDR consideration

Achieved, with the 'Imagine – Why cities should know about underground space' video. The video is supporting our continuing work with our three Global Partners and UN-Habitat and UNISDR.



To organise an ITA Grant Scheme for students of urban planning in conjunction with ITACET

Achieved, education and training was given priority; a two day training course was developed and held on behalf of the ITACET Foundation. The involvement of students and young planning professionals is underway in cooperation with ISOCARP.



To further develop the ITA Global Perspective as an initiative to identify companies worldwide that are committed to the aims of the programme

To be developed.



To hold annual or bi-annual summit meetings with urban leaders to foster public understanding of urban underground space.

To be developed, as part of the cooperation with ICLEI by using their network to build a platform for a Global Conversation.

# ITA Global Perspective Open Session 2012 – Bangkok

Promoting Underground Space for Development of Resilient Cities



## Exploring the disconnect with urban planners

Well into its three-year mission, the International Tunnelling and Underground Space Association Committee on Underground Space (ITACUS) is making substantial progress with its Global Perspective programme of promoting and understanding that tunnels and underground space can and must contribute efficiently and cost effectively to cope with rapid urbanization and the affects of evident climate changes. Its proactive objective, of engaging with societies of associated professionals, is taking the message to a wider and equally influential audience and stakeholders. In Bangkok at the ITA World Tunnel Congress (WTC) in May 2012, the ITACUS Open Session was conducted in association with ISOCARP, the International Society of City and Regional Planners, with some surprising revelations and points of disconnect.





The world's first underground computer chip making factory in Switzerland; an Underground Science Park in Singapore to accommodate 3,000 to 4,000 workers, and a earthscraper in Mexico City that will reach down for as far as skyscrapers reach up - these are a few of the real examples of how the underground is advancing societies around the globe with the growing realization by urban planners and decision makers that space on the surface is precious and becoming increasingly scarce.

Exposé and description of these innovative projects served to inspire attendees at the ITACUS Global Perspective Open Session during the ITA World Tunnel Congress in Bangkok in 2012. In her Insight II presentation, Antonia Cornaro, Secretary General of ITACUS, demonstrated that no longer is the underground a place to hide incompatible and undesirable uses, but that research laboratories, cultural and recreational facilities, offices and housing are finding real, beneficial and cost effective location underground. Cornaro urged everyone in the delegation to be daring, creative and innovative "to overcome the negative associations linked with being underground".

Aside from providing the vision of underground potential, the tunnelling industry can help urban planners and decision makers address the very real planning issues and answer fundamental questions such as; what uses can you put underground; at what level; what kind of safe-guards are needed; and what kind of standards and construction standards are required?

"As planners we have extensive regulations for the surface but we have no regulatory arrangements for the subsurface," said Dr Shipra Narang Suri of India, Vice President of ISOCARP, the International Society of City and Regional Planners, and partner organisation of the 2012 Bangkok Open Session. "Also, how do you link public and private development underground? To date it has been largely piecemeal. Someone builds a basement of four levels and someone else builds one of two levels. How do you record all that in 3D? New types of mapping are needed that include registration, ownership and transfer of underground properties. These are extremely important issues."

Martin Knights, Immediate-Past President of the ITA agrees that planners, faced with the

## The Lowline

### Creating new areas of greenery in a dense urban environment

The Lowline is a visionary proposal for the world's first underground park on Manhattan's Lower East Side. Co-founders James Ramsey of Raad Studio and Dan Barasch first proposed the project - to be housed in a former underground trolley terminal - in 2011, quickly generating widespread media and political support. In 2012, the project successfully raised over \$150,000 from over 3,000 backers to create a full-scale exhibition titled "Imagining the Lowline". The exhibit, demonstrating the proposed solar lighting technology saw over 11,000 visitors, featured design talks, school visits, weekend street fairs and a political event. Barasch and Ramsey worked with advisors and consultants on a feasibility study outlining the cost to build the park, long-term business model and community benefits of the project, such as providing a unique space in which trees and grass would be grown beneath the busy city streets.

realization that surface space is precious and scarce, have to find ingenious solutions and engineers must provide ingenuity and convincing arguments for building underground. "We have to work with planners to convince them that we have the solution to place urban infrastructure safely and cost effectively underground," said Knights.

Singapore, among other nations of the world, is actively investigating the potential of the underground for new uses. The Government has invited consultants to explore the possibility of housing all types of facilities underground including water treatment plants and desalination plants, saving vast amounts of unavailable land in the process.

As a further example, Helsinki is one of the smallest cities by area in Finland but the largest in population with an extensive and growing underground dimension. "More than 10 million m<sup>3</sup> of underground space has been excavated and built at a cost of just €100/m<sup>3</sup> as an average," said Ilkka Vahaaho of Finland, a steering board member of ITACUS.

Narang Suri, admits that not enough consideration is given to the underground by

ISOCARP as a Society. "As planners, we are not even considering it in our scheme of things, and as we have heard there are enormous possibilities." Founded in 1965, ISOCARP has members in more than 80 countries, retains formal consultative status with UNESCO, and is an NGO (non-governmental organisation) and professional partner of UN-Habitat and of the Council of Europe.

There is much to gain when engineers and planners work in tandem says Antonia Cornaro - herself an urban planner working for an engineering firm. "Engineers put forward solid and feasible solutions from a technological point of view while planners are good at wrapping up the overall concept and analyzing and showing the wider benefits," she said.

Jean-Pierre Palisse of the Greater Paris Region Institute for Urban Planning (IAU-IdF) reported in his opening Insight I presentation in Bangkok, said that the French Association for Tunnels and Underground Space (AFTES), has launched a programme to research specific areas of the Paris master plan to understand how better to advance an underground strategy. "Despite adopting the

### **The Lowline** – Unique space with trees and grass beneath the city streets

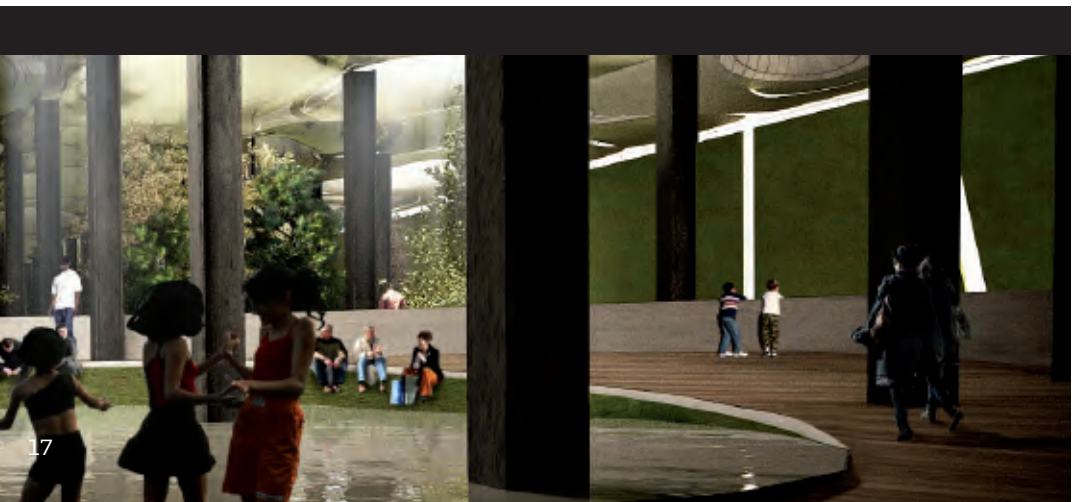


master plan for a Compact Metropolis in 2008, the idea remains a dream,” said Pallise. The AFTES is investigating ways to address human resistance to being underground, the cost of building and operating underground infrastructure, the difficulty of managing emergencies underground, and the long and difficult procedures of dealing with complex and rigid property ownership and legal frameworks. Pallise said that an important and interesting aspect of the project is the opportunity it offers to create a new regard for the underground and an occasion to make people work together – engineers, planners, environmentalists. “A new culture is being established to help us convince political decision makers and private actors to go into this more innovative and imaginative field of underground space development.”

To support this new culture, Narang Suri, as representative of the Open Session partner organisation ISOCARP, suggested a joint undertaking, with ITACUS to research and document best practices of cities that are developing their underground to understand how and what has been achieved and what are the challenges. “So that we can educate and convince

other cities to come forward and try and take on new projects and new innovations. We need to be able to showcase five to 10 path-breaking, pioneering cities, and explore the processes from not only the engineering, but also a planning perspective. This we should do in the next year or so.”

In addition to surface constraints, natural disasters, especially flooding, are forcing urban planners to investigate underground solutions. The devastating floods of late 2011 that hit Thailand and the city of Bangkok, the host city of the 2012 WTC session, caused an estimated US\$46.6 billion in damages and losses. While the figure is staggering, Bangkok’s existing underground drainage systems protected the city center from Thailand’s worst natural and economic disaster of modern times. The city has 19km of storm drainage tunnels linked with a pumping capacity of 160m<sup>3</sup>/sec, which saved the city centre in the 2011 flood calamity and a new 16km long network of 5m diameter tunnels is being planned on the west side of the city to expand its flood protection strategy. With a pumping capacity of 60m<sup>3</sup>/sec the new 19km of storm drainage tunnel has an



estimated investment of THB 7,500 million (about US\$225 million).

According to Narang Suri most cities take a two-track approach to resilience against natural disaster.

**Mitigation** - to offset the on-going process of climate change, including cutting green house gases, reducing urban sprawl, increasing densification, increasing use of public transport; and

**Adaptation** - to minimize the impact of disasters by moving critical infrastructure out of vulnerable areas and implement strategies to protect vulnerable sectors of the society such as the poor who live on river banks and many illegally on open floodplain spaces.

Martin Herrenknecht, CEO of the Herrenknecht Group, in a panel discussion of the Bangkok Open Session, suggested that it is in the interest of the international insurance industry to promote, for example, the feasibility of projects to prevent urban flooding. The cost in losses of a major flood, he explained are much higher than the cost, and, in many cases, the construction, of a project that

would protect a city centre in the flood season for many years to come. "We must also bring the public into the project as a powerful third party as well as the politicians. They together have more power over how infrastructure projects will develop than the industry itself."

As a specific comment concerning flood control, Herrenknecht illustrated how a tunnel system with a pumping installation to lift flood water directly to the sea would have a great capacity than a wide but slow flowing canal system. "The ability to pump out the storage volume of the tunnel system creates much greater capacity of the underground alternative, and these engineering issues we must also keep in mind when promoting flood control projects for example."

### Underground costs

The perception that all underground construction is more expensive than its surface alternatives often eliminates the underground as a viable option even before the option is investigated. This misperception must be corrected said Felix Amberg of Amberg Engineering. As part of the industry-contribution discussion panel of the Open Session, he said that: "An independent

**The Lowline** – Underground historic trolley terminal in New York to be converted into an extraordinary subterranean



analysis demonstrated that the underground solution for the computer chip manufacturing factory in Switzerland would be 7% more economical in life-cycle costs over a 50-year period of operation. This was a much more persuasive fact to the client than assurances that workers would feel fine working underground."

Convincing planners to use factors other than the initial capital cost as the differentiator for evaluation of underground development options is critical said Knights. "There is the life-cycle investment and the legacy of the project for the future to consider," he said. "There is also a cost for not planning for the future," he stated.

In closing the Bangkok Open Session, ITACUS Chairman Han Admiraal agreed that all sectors of the industry as well as the efforts of associated professions are needed to work together to succeed in the mission and invited everyone to join the next Open Session at the 2013 World Tunnel Congress in Geneva, Switzerland.

"These huge skyscrapers take away from the view of the sky. So the question of where we can we build new public spaces has made a new generation of urbanists think very creatively about what to do with the spaces around the city."

**Dan Barasch** – *co-founder the lowline*

an public park





# ITA Global Perspective Open Session 2012 – Bangkok

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## Programme



Open Session Chair: Han Admiraal,  
Chairman ITA Committee on Underground Space – ITACUS

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Opening of Session: From Helsinki to Bangkok

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Opening Statement by Martin Knights – immediate past-President ITA

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### How do Cities Plan for the Use of Underground Space?

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**Insight I** – *The Underground Contribution to Paris Region Sustainable Development*  
by Jean-Pierre Palisse – Greater Paris Region Institute for Urban Planning (IAU-IdF)

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**Insight II** – *Underground Space and Urban Planning* by Antonia Cornaro –  
Secretary-General ITACUS

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*Panel discussion* with Martin Knights, Jean-Pierre Palisse, Antonia Cornaro and  
Shipra Narang Suri – Vice-President ISOCARP

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### How can Underground Space Contribute to City Resilience?

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**Insight III** – *The 2011 Thailand Floods*, special report by Chawalit Chantararat –  
Managing Director of TEAM Group

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*Panel discussion* with Ray Sterling – Vice-Chairman ITACUS and President of  
ACUUS, Ilkka Vähäaho – Steering Board member ITACUS, Chawalit Chantararat,  
Shipra Narang Suri, Zaw Zaw Aye – Vice President TUTG. During this panel  
discussion the audience will be invited to participate and to provide thoughts and  
ideas on this topic.

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### How can the Global Perspective Programme Help our Industry?

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**Insight IV** – *The Chemical Industry's Responsible Care Programme* by Mark Volmer  
– Senior Vice President, BASF Construction Chemicals Asia Pacific.

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*Panel discussion with industry leaders:* Daniel Ruckstuhl – ITATECH Chairman,  
Martin Herrenknecht – CEO Herrenknecht Industries, Pekka Nieminen – Sandvik,  
Felix Amberg, Amberg Industries, Enrico Dal Negro – MAPEI.

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*Summing Up of the Session* by Martin Knights, Antonia Cornaro and  
Shipra Narang Suri, followed by Close of Session by the Session Chair.

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# ITA Global Perspective Open Session 2012 – Bangkok

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## Key Insight Speakers

### Jean-Pierre Palisse

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Deputy CEO of the Greater Paris Region Institute for Urban Planning (IAU-IdF)

Jean-Pierre Palisse is an Architect and Town planner. As deputy CEO of IAU-IdF, he has worked since 1983 on all regional planning policy documents as the Regional Master Plan (SDRIF) and the Urban Mobility Plan (PDUIF). As an urban planning expert, he has advised many mega-cities. He is now involved with the national research project “Ville 10D” which aims at promoting the use of underground space to implement a more sustainable city.

### Antonia Cornaro

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Secretary-General, ITA Committee on Underground Space - ITACUS

Antonia Cornaro is an Urban Planner who graduated from NYU (New York University) in New York City. She worked amongst others for NYC’s Transportation and Urban Planning Department, the Austrian Institute for Regional Planning and since 2010 she works for Amberg Engineering. Antonia has a long affiliation with ISOCARP, which will help strengthen the ties and common interests between ISOCARP and ITACUS.

### Chawalit Chantararat

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Managing Director of TEAM Group

Chawalit Chantararat is a Managing Director of TEAM Group, a conglomerate of Thai-based consulting firms. He obtained his Bachelor’s degree in Civil Engineering from Khon Kaen University and Master’s degree in Water Resources Engineering from the Asian Institute of Technology in 1979 and 1981 respectively. With TEAM Group, he played a major role in providing consultancy services during and after the 2011 floods in Thailand.

### Mark Volmer

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Senior Vice President, BASF Construction Chemical Asia Pacific

Mark Volmer is heading the regional business unit for Construction Chemicals Asia Pacific since July 2008 and is located in Shanghai, China. The business unit spreads over 120 locations in 17 countries in Asia Pacific and employs over 1,400 people. Mark Volmer was born in Amsterdam, the Netherlands. He got a Master of Science in Chemistry from the Free University of Amsterdam and received an MBA from the Rotterdam School of Management.

# ITA Global Perspective Open Session 2011 – Helsinki

Delivering Better and Resilient Cities – *by Shani Wallis*

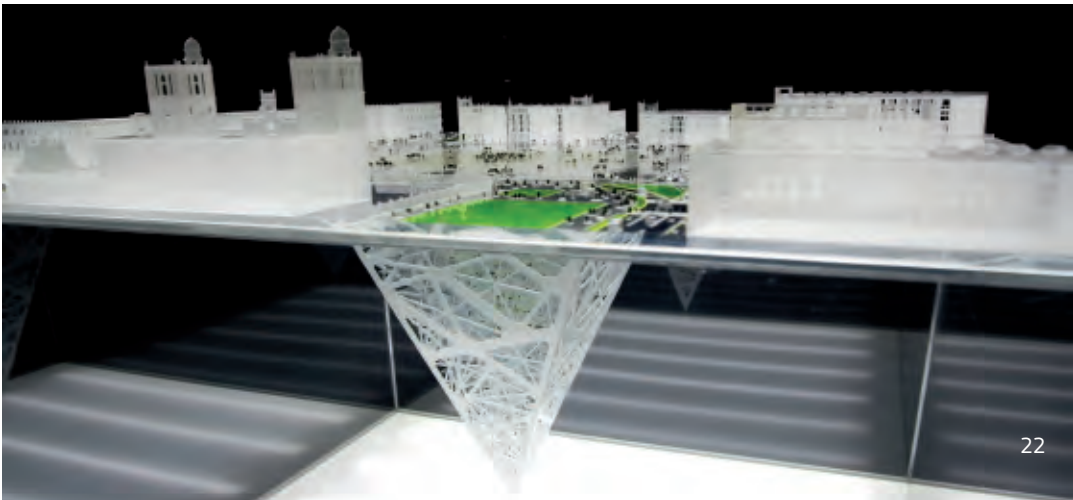


## Key Insights

An eyewitness report of the catastrophic aftermath of the earthquake and tsunami that hit the east coast of Japan in March 2011 acted as a powerful focus for the purpose of the ITA WTC 2011 Global Perspective Open Session in Helsinki.

Another contribution threw down the gauntlet to the tunnelling community. Helena Molin-Valdes, the Deputy Director of the United Nations International Strategy for Disaster Reduction (UNISDR), challenged the association of tunnellers to join a mission to influence the design and development

of modern cities that are capable of withstanding the consequences of natural and man-induced disasters as well as the threatening effects of climate change. After describing her visit to the iconic SMART stormwater management and road tunnel in Kuala Lumpur, as an example of modern, multi-purpose underground urban development, Molin-Valdes said: "We need you. Disasters are on the rise and these events lead to loss of life and livelihoods. We need you to engage with us to share knowledge and present the reality of tunnelling and underground space engineering as part of the solutions for developing resilient cities."



Organised by the ITA's Committee on Underground Space (ITACUS), and presented under the 2011 theme of Delivering Better and Resilient Cities, these were two of five 'insight' presentations that established the framework on which discussion and forum participation was based. Han Admiraal, as Chairman of ITACUS, explained in his presentation that now is the time for the tunnelling industry to demonstrate to the world its importance in helping address the challenges that the planet is facing. He said: "We have to turn our passion for tunnelling and underground space into a global responsibility towards sustainability and resilient cities as a justification for the work we do."

In advancing its Global Perspective, ITACUS will work with three international organisations that have the development of sustainable and resilient cities as their core concern. The first is the International Federation for Municipal Engineering (IFME), which joined the ITA Open Session in Helsinki. The Federation was formed in 1960 as part of the UNESCO organization, and today has more than 20 member nations. Through its mission of fostering continued improvement in the quality of public works and wider community

services, the IFME and its members will contribute much to the Global Perspective Programme. In Helsinki, Dan-Henrik Långström, President of the Finnish Association of Municipal Engineering, confirmed the involvement of the IFME and signed a Memorandum of Understanding with ITACUS to seal its commitment to the Global Perspective Programme.

The second Global Partner organisation is the International Society of City and Regional Planners (ISOCARP), which joins ITACUS for the Global Perspective 2012 Open Session in Bangkok.

In 2013, ICLEI, the Association for Local Governments for Sustainability, and its large membership of decision makers, will join ITACUS to discuss the programme theme Deciding Better and Resilient Cities in Geneva.

Through its consultative non-governmental status with the United Nations (UN) since 1987, the ITA (International Tunnelling and Underground Space Association) has also entered into partnership with two UN bodies – the International Strategy for Disaster Reduction (UNISDR) and the UN-Habitat Human Settlements Programme.

## The Earthscraper

### A 65-story-tall skyscraper buried under Mexico City

Changing our cities, through genius, creativity and audacity is what Joan Clos, the Executive Director of UN-Habitat, calls for. In searching for examples of this in the field of Underground Space Use, ITACUS found the Earthscraper project. The Historic Centre of Mexico City is in desperate need of a pragmatic make-over. New infrastructure, office, retail and living space is required but no empty plots are available on the surface. Legislation prohibits demolishing historic buildings and height regulations limit new structures to eight stories. Given these challenges, the Earthscraper is the skyscraper antithesis in a historic urban landscape where high-rise building is forbidden and the preservation of the built environment is seen as essential. The Earthscraper is an inverted pyramid with a central void to allow all habitable space underground to enjoy natural light and ventilation.

Both organisations share a mandate to address the global issue of mass migration to mega cities, urbanisation and the resilience of modern cities to cope with natural disasters and the affects of climate change. A principal aim of the three-year Global Perspective initiative is to present a policy document, which will be supported by the city planners, city governments and city engineers represented internationally through ISOCARP, ICLEI and IFME, and have that policy document adopted by the two UN partners.

Guest speakers and presenters of the other insight presentations in Helsinki described how they encounter the use of underground space in their day-to-day professional lives.

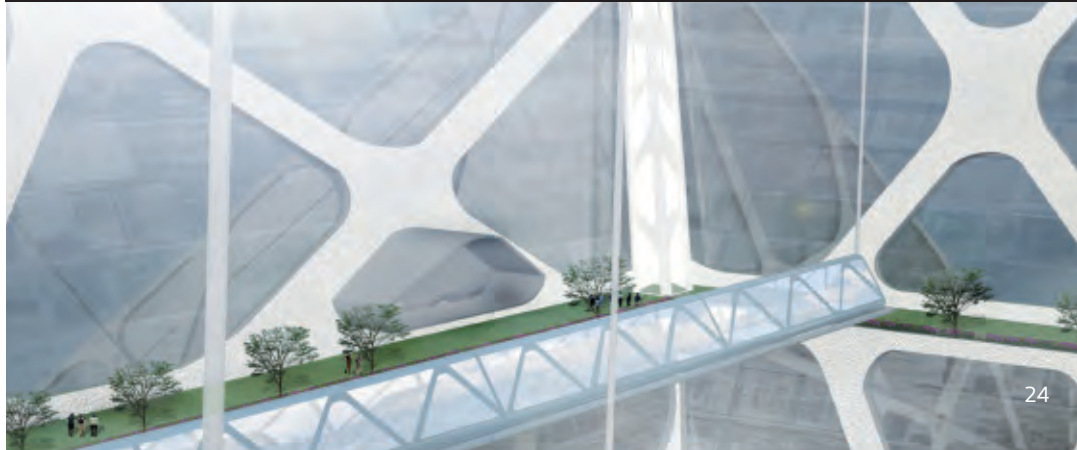
Hannu Penttilä, Deputy Mayor for City Planning in Helsinki, described the network of underground space beneath the streets of Helsinki and explained how more underground development is being planned. Helsinki is the first city in the world to adopt an Underground Masterplan as part of its urban development policy. This is facilitated, explained Penttilä, by the fact that 60% of land in the city is owned by the local government and that the city is built on solid granite which is highly

favourable for excavating cost-effective underground facilities.

Jacques Besner, an independent consultant from Canada and former Secretary-General of the Associated Research Centres for the Urban Underground Space, was allied closely with the development of 32km of underground space in Montreal. Work that started in 1962 now links 62 buildings, and Besner described how much of the network was financed by private finance through PPP (public private partnerships). He explained the importance of determining exactly who owns the environmental space of the project, describing how an incidence of surface settlement resulted in a court case to decide ownership of the subsurface space and the responsibility therefore to deal with the settlement damage on the street. He spoke about how a relatively minor initial situation became a much greater problem by being left unresolved for several months.

Andis Kublacovs, Manager of the Northern Transport Corridor Project for the City Council of Riga in Latvia described the development of €1 billion city ring road highway project, and how an immersed tube is being developed for the river

**The Earthscraper** – The core is largely made of glass to ensure that all parts of the building receive natural light



crossing instead of a less costly high level bridge. This is in order to preserve the landscape of the city, which is the largest UNESCO World Heritage site. At another part of the project, a bored tunnel, although 40% more expensive than a surface alignment, has been supported by a citizens' vote to avoid splitting the community. The alignment goes deep beneath a cemetery, and although there has been understandable concern about the potential damage construction of a tunnel might cause, local residents have seen fit to trust the tunnelling industry.

"Latvia has no expertise or experience in building tunnels and visiting experts have assured us that there will be no affect at all on the cemetery," said Kublacovs. "We must trust them."

It was the presentation by Prof Tetsuya Hanamura (retired) of Okayama University in Japan, that gripped the attention. The devastation suffered by the city of Sendai and the 20 other towns and cities along a 600km stretch of Japan's east coast after the earthquake and catastrophic tsunami was described after his own visit to the stricken area. Prof Hanamura (who is also a member of the ITACUS Steering Board) explained that 25,000

people died or were missing as a result of the disaster but that it was the tsunami that caused most destruction.

"Although a very large magnitude 9 event, earthquake damage was small compared to the wreckage of the tsunami. Most loss of life was due to drowning and while many surface buildings were swept away by a wall of water, with run-up heights of 10m and 15m at the highest, there was little or no structural damage to underground infrastructure."

He reported that liquefaction had caused damage to the Sendai sewage treatment plant, but that damage to utility tunnels was minimal and that both water supply and sewerage systems were either unaffected or restored quickly.

Electricity and shallow gas supply lines were damaged badly but the underground LNG (liquefied natural gas) storage facilities in the area were safe.

"There was no damage to the subway or railway tunnels in the area, at all, and the road tunnel at the Sendai Airport was only flooded."



The gravest consequence of the disaster was the meltdown of the reactors at the Fukushima Daiichi nuclear power plant. A tsunami wave of 15m swept over the 5.7m seawall and completely flooded the plant.

The loss of electricity knocked out the cooling seawater systems for the reactors, which then overheated, failed and released disastrous radiation into the atmosphere. Prof Hanamura raised the suggestion that all of this might have been avoided had the power plant been built underground.

"Approximately 2,000 nuclear test explosions have been conducted underground and apart from some incidents in the early stages, no significant escape of radiation material has occurred as a result", he said.

"Maybe after the current disaster recovery, the option for building underground nuclear power plants can begin."

### Discussion forum

During the open discussion, cost, funding and procurement of underground facilities were central topics.

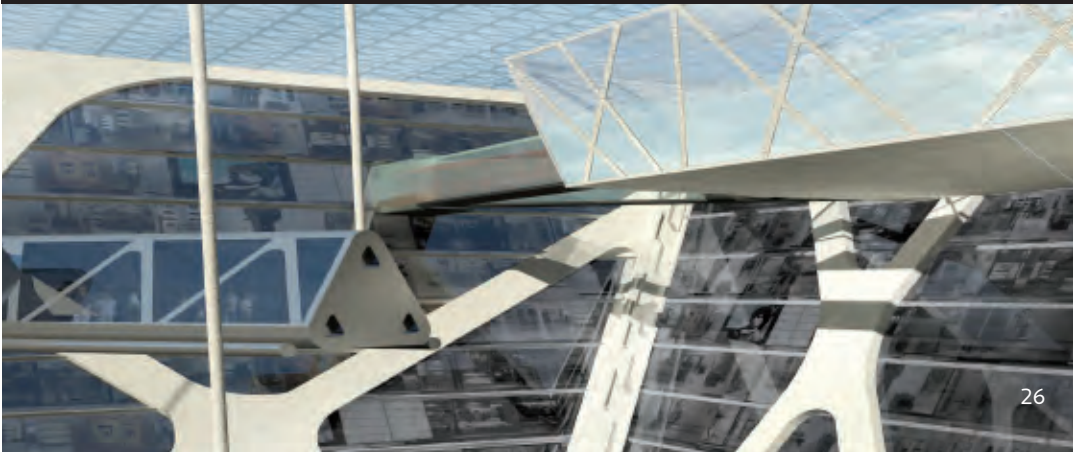
Jacques Besner explained how the PPP model of delivery had come under much criticism. How to oblige private companies to integrate the underground space and connect it all together was another of his concerns.

"In one instance in Montreal the City had to rent the public space back from the developer to keep it open and maintain access to the metro station for the full operation time of the metro. So it was not a case of selling off public space but of renting it back. There were also issues of deciding who is responsible for maintenance of the structures; the developer or the municipality."

Several agreed that, in general, the public is unaware of being underground when in subsurface public malls and shopping arcades, providing the spaces are well lit and clean. In Montreal the City has organised art exhibitions in its underground space, and an annual half marathon through the network of pedestrian corridors attracts the public to a vibrant part of the city.

In Riga Andis Kublacovs said that the general public are in favour of tunnels but have asked questions about rising sea levels and other safety issues.

### The Earthscraper – A metro station serving the underground complex passes through the building





"Communication to allay the fears and worries of a community new to tunnels and underground space environments is a key issue", he said.

Another call by Harold Wagner of Austria was for traffic segregation into inner cities with a network of small-diameter TBM tunnels built to transport freight in and waste out using remote controlled trains.

"This would reduce the time and energy wasted in traffic congestion on the surface and would save about 15c/km on current delivery methods. This might not sound like much but it would add up and provide a return on investment very quickly," he suggested.

In her video link from Geneva, Helena Molin-Valdes made the same point about the SMART tunnel in Kuala Lumpur.

"The report was that in the three years since the tunnel opened, the project has been paid back in just the amount of non-losses of the flooding events that it has prevented. This is powerful data for us to use in the promotion of underground projects."

Nick Barton, a professor of rock mechanics in Norway and Brazil, suggested that going deeper with longer tunnels into bedrock might be cheaper than selecting shorter shallower tunnels in softer overlying soils.

"Deeper tunnels in rock can be a quarter or a third the price of a shallower tunnel excavation and up to 10 times faster to complete", he said.

"If you are lucky enough to have good rock under your cities and you go deeper to maximize the advantage, the budgets can stretch further."

Martin Knights, Immediate Past President of the ITA, asked the panel of speakers if they could ever see a time when cities were forced by legislation to place public facilities underground.

"In Riga it is not increasing density of the urban space that is the issue. The city is actually losing population, and is only 1.1 million any way. Development is needed to solve parking issues in certain areas but the preservation of the cityscape and the issue of liveability on the surface is driving the preference for tunnels at the moment", said Kublacovs in reply.



The same holds true in Helsinki. "The city is the first in the world to adopt an Underground Masterplan for urban planning, but it is not forced," said Penttilä.

"Rather education and awareness is the influencing factor. We are seeing that even in the suburbs, new housing developments are providing underground car parking facilities, for example, in order to save the green space on the surface. This is occurring without legislation."

In Montreal, Besner explained that the current 32km of underground space started with a few small tunnels to provide underpass crossings of the street and has developed without legislation from there.

In Japan, the underground is developed as part of the holistic approach to urban planning said Prof Hanamura.

"The underground is designed at the same time as the above-ground structures."

The need for co-operation between the different professions involved in urban planning was

also discussed. "We do not want engineers to become urban planners," said ITACUS Chairman Han Admiraal, "but co-operation has to be more efficient and effective for developing solutions."

That is certainly evident in Riga, according to Kublacovs, who explained how it was only architects involved in city planning in former times.

"Today lawyers and engineers and planners and the citizens themselves are all involved in development plans."

A significant point raised was that much of the discussion was about rich "pocket sized cities where we can do all that we want", said Penttilä of Helsinki.

"The real challenge is in developing countries, where resources are scarce and where cities are growing fastest. We need really brilliant planning to solve those problems."

Harvey Parker, a Former President of the ITA from the USA, raised two specific points. First the urgent need for training and education of

**The Earthscraper** – The public areas of the underground building are expected to become a popular destination



the engineers and workers needed in the coming years to develop, design and build the many underground projects that will be needed by the world's mega cities in the immediate future; and secondly, that planning decisions must not be made on capital cost alone.

"Life-cycle costs are as vital to the decision making processes as hard financial issues," he said. "There is going to be so much to do, we need to start planning right now."

In response Admiraal explained that ITACUS is working with the other committees of the ITA as well as with the resources of the ITA Working Groups to fully capitalise on the power of the Association to bring real possibilities and contributions to the Global Perspective Programme.

This is extended to its co-operation with the Programme's three global partners IFME, ISOCARP and ICLEI, and to its policy partners UN-Habitat and UNISDR.

### Close of Session

In closing the session Admiraal said that two points were highlighted through the session for him. One, the need to bring professionals together to work together for optimum effect; and two, that "for the first time we tunnellers had a direct link into the UN and its operations.

We heard how Helena Molin-Valdes of the UNISDR said 'we really need you to work with us'. That is a tremendous compliment to the ITA, to all of us as engineers, and a challenge for us to engage seriously and urgently in the big problems that this world is facing."

## "We need your help to develop resilient cities."

**Helena Molin-Valdes** – *Deputy Director of the UNISDR*



# ITA Global Perspective Open Session 2012 – Helsinki

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## Programme



Opening address, launch of ITA's Global Perspective: Prof In-Mo Lee

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Global Partner Address: Dan-Henrik Långström

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Introduction of ITA's Global Perspective – Han Admiraal

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## Delivering better en resilient cities

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**Insight I** – *The need for resilient cities* by Helena Molin-Valdes – Deputy Director United Nations International Strategy for Disaster Reduction (UN-ISDR), Geneva, Switzerland

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**Insight II** – *Helsinki Underground world towards 2030* by annu Penttilä – Deputy Mayor for City Planning, City of Helsinki

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**Forum I** – with Moderator, Molin, Penttilä, Besner, Hanamura, Kublacovs

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**Insight III** – *The resilience to man-made disaster of underground space* by Jacques Besner – Independent consultant, Canada, in the field of underground space planning, advisor to the Board of ACUUS (Associated research Centers for the Urban Underground Space) and former Secretary-General of this association

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**Insight IV** – *Special report: the Japan earthquake and underground space* by Tetsuya Hanamura – Retired Professor at Okayama University, Japan, and member of the Steering Board of ITACUS

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**Insight V** – *Underground Space Use from the perspective of the City of Riga* by Andis Kublacovs – Manager of Riga Northern Transport Corridor Project, Riga City Council

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**Forum II** – with Moderator, Molin, Penttilä, Besner, Hanamura, Kublacovs

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# ITA Global Perspective Open Session 2011 – Helsinki

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## Key Insight Speakers

### Helena Molin-Valdes

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Helena Molin Valdés works for UNISDR, the United Nations Office for Disaster Reduction. She is currently coordinating the Making Cities Resilient campaign 2010-2011. She trained as an architect in Sweden and has worked for the UN since 1992.

### Hannu Penttilä

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Hannu Penttilä has served as Deputy Mayor of the City of Helsinki since 2008. His main areas of responsibilities are City Planning and Real Estate as well as Housing. He is also Chairman of the Board at Helsinki City Housing Company that owns and administrates over 43,000 publicly financed dwellings.

### Jacques Besner

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Jacques Besner (Canada) is an independent consultant in the field of underground space planning. He is an advisor to the Board of ACUUS (Associated research Centers for the Urban Underground Space) and the former Secretary General of this association.

### Tetsuya Hanamura

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Tetsuya Hanamura (Japan) is a retired professor from Okayama University. He has been a member of the Steering Board of ITACUS from the start of this committee. For the Open Session 2011 he prepared a special report on the Japan Earthquake and Tsunami, based on his own observations made after the event and shortly before the congress.

### Andis Kublacovs

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Andis Kublacovs (Latvia) is manager of Riga Northern Transport Corridor Project being carried out for the Riga City Council. He is a planner by training and a member of ISOCARP. He is also an active member of the Latvian Association of Spatial Planners.

# Global Policies

Working for a better urban future



## UN-Habitat

Our mission is to promote socially and environmentally sustainable human settlements development and the achievement of adequate shelter for all.

The United Nations Human Settlements Programme, UN-Habitat, is the United Nations agency for human settlements. It is mandated by the UN General Assembly to promote socially and environmentally sustainable towns and cities with the goal of providing adequate shelter for all. As our towns and cities grow at unprecedented rates setting the social, political, cultural and environmental trends of the world, sustainable urbanisation is one of the most pressing challenges facing the global community in the 21st century. In 1950, one-third of the world's people lived in cities. Just 50 years later, this

proportion has risen to one-half and will continue to grow to two-thirds, or 6 billion people, by 2050. Cities are now home to half of humankind. They are the hub for much national production and consumption – economic and social processes that generate wealth and opportunity. But they also create disease, crime, pollution and poverty. In many cities, especially in developing countries, slum dwellers number more than 50 percent of the population and have little or no access to shelter, water, and sanitation. This is where UN-Habitat is mandated to make a difference for the better.

'From Outer Space to Underground Space' - ITACUS presenting during a UN Inter Agency Meeting





Our mandate is to serve as the focal point in the United Nations system for the coordination of disaster reduction and to ensure synergies among disaster reduction activities.

Created in December 1999, UNISDR is the secretariat of the International Strategy for Disaster Reduction (ISDR). It is the successor to the secretariat of the International Decade for Natural Disaster Reduction with the purpose of ensuring the implementation of the International Strategy for Disaster Reduction. Its core areas of work include ensuring disaster risk reduction (DRR) is applied to climate change adaptation; increasing investments for DRR; building disaster-resilient cities, schools and hospitals; and strengthening the international system for DRR.

UNISDR's vision is based on the three strategic goals of the Hyogo Framework for Action: integrating DRR into sustainable development policies and planning; developing and strengthening institutions, mechanisms and capacities to build resilience to hazards; and incorporating risk reduction approaches into emergency preparedness, response, and recovery programmes.



# Global Partners

Our global partners working with us to further the concept of underground space

## IFME



International Federation for Municipal Engineering

Globalisation, localisation and the knowledge revolution are three key driving forces in the world today. They also clearly come under the gamut of an international organisation such as IFME whose member organisations represent municipal and public works engineers working at a local level.

A key objective of the Federation is to foster technical and cultural exchange between municipal and public works engineers world-wide. International exchange of information, innovations, skills and experience is even more important in today's world than when the Federation was formed more than 50 years ago.

IFME's mission is to connect Municipal Engineers and Public Works Professionals, Public Agencies, Organisations, Institutions and Businesses around the world in order that they share a global pool of knowledge and experience. The aim is to foster continued improvement in the quality of public works and wider community services.

ITACUS signed a Memorandum of Understanding with IFME during the ITA Global Perspective Open Session in Helsinki in 2011. ITACUS will take part in the IFME World Congress, which will be held in Helsinki in June 2012.

## ISOCARP



International Society of City and Regional Planners

While cities of the global North face challenges of physical expansion and urban sprawl, those in the South are experiencing rapid and uncontrolled urbanisation, competing demands for land and other increasingly scarce natural resources, and air, water and surface pollution. Unsustainable urban development is a common challenge, especially in metropolises and megacities, whether in developed or the developing world.

In this context, the International Society of City and Regional Planners (ISOCARP) is working towards producing knowledge for better cities. A global association of professional planners, ISOCARP was founded in 1965 and today its network brings together individual and institutional members from more than 80 countries worldwide. The Society has a formal consultative status with UNESCO and is recognized as an NGO/professional partner by UN-Habitat and the Council of Europe.

During the ISOCARP congress in Wuhan in 2011, ITACUS held a Technical Seminar. Further co-operation between both bodies is being worked out and will focus on the Urban Planning Advisory Team (UPAT) concept with which ISOCARP is very successful.

## ICLEI



### Local Government for Sustainable Development

ICLEI - Local Governments for Sustainability is an association of more than 1,220 local government members who are committed to sustainable development and who come from 70 different countries and represent more than 569,885,000 people.

ICLEI was founded in 1990 as the 'International Council for Local Environmental Initiatives'. The Council was established when more than 200 local governments from 43 countries convened at its inaugural conference, the World Congress of Local Governments for a Sustainable Future, at the United Nations in New York.

ITACUS is pursuing talks with ICLEI on further co-operation. Initial meetings were held during the World City Forum meeting in Abu Dhabi in 2011 and the Resilient City Conference in Bonn in the same year.

For ITA, ICLEI is a meaningful organisation as it brings together people who actually take the decisions on where cities are heading. Providing basic knowledge on the possibilities of urban underground space use is one approach which will be explored.



Urban planning being introduced at WTC 2012 Open Session, Bangkok



ITACUS Steering board and members at Underground Space Training session, Singapore, 2012



Signing of the MoU with ISOCARP, Perm, Russia, 2012



ITACUS is one of the permanent committees of the International Tunnelling And Underground Space Association – ITA

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Photography  
Earthscraper Project – with kind permission of BNKR Architectura

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**The Lowline** – Unique space with trees and grass beneath the city streets