International Ocean Institute

IMAREST Institute of Marine Engineering, Science & Technology

PIM XXXI 2005

Pacem in Maribus XXXI Conference

31 October - 3 November 2005

Conference Proceedings

Townsville, Queensland
Australia

Building Bridges Towards Integrated Oceans Governance:

Linking Ocean Science, Engineering, Technology and Policy

Editors
G. Robin South & Constantin Boese

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A Message to His Excellency, Mr. Kofi Annan, Secretary General of the United Nations from the Pacem in Maribus XXXI Conference

(Townsville, Australia, Oct. 31-Nov. 3, 2005)

Mr. Secretary General:

Building on your report 'In Larger Freedom' and with the aim of contributing to the achievement of the Millennium Development Goals, the participants in 'Pacem in Maribus XXXI Conference' believe that the critical condition of the oceans and coasts justifies bringing to your direct attention the concerns, conclusions and recommendations of the Conference. The Conference addressed the state of the oceans in its varying manifestations and the linkages of ocean science, technology and policy. The Conference decided to address this message to Your Excellency, in the hope that through your good offices it can be brought to the attention of the international community, the UN System, including the Global Compact and the Bretton Woods Institutions.

The Conference, cognisant of the interdependence between the oceans, coasts and economic and social development, expressed deep concern at the absence of "the oceans" from the international development agenda, and the erratic evolution of ocean governance outside the framework of the United Nations.

The 150 ocean scientists, engineers, economists, and policy makers, many world renowned, who met in Townsville, wish to communicate the following:

Health of the Ocean and Ocean Governance.

The Conference wishes to make the following points:

- There is an urgent need to develop ocean legislation that is enforceable and has long term sustainable use of the ocean at its heart.
- There is great concern at the state of lawlessness on the high seas.
- There is a lack of clear and applicable international law to protect ocean biodiversity and deep sea bed ecosystems.
- There is a need to promote the development of a competent liability and compensation regime to cover sea shipments of radioactive waste.
- There is a need to convince ship owning companies to accept the Principles of the Global Compact.
- There is a need to develop guidelines:
    - On the introduction of sounds into the ocean.
    - For the regulation and governance of floating nuclear power plants.

- To improve enforcement of fisheries regulations, and to eliminate IUU fishing, including a comprehensive regime to end flags of convenience and its IUU fishing activities.

The Conference was disturbed by unfettered fishing on the high seas and is convinced of the need to establish a moratorium on bottom trawling, particularly on seamounts.

The Conference called on the International Seabed Authority to take into account the precautionary principle to protect the biodiversity of the seabed and to designate areas of the seabed as marine protected areas in accordance with the principle of common heritage of humankind.

At the World Summit on Sustainable Development, held in Johannesburg, South Africa, from August 26 to September 4, 2002, States agreed, in paragraph 36 (b) of the Johannesburg Plan of Implementation, to "Establish by 2004 a regular process under the United Nations for global reporting and assessment of the state of the marine environment, including socio-economic aspects, both current and foreseeable, building on existing regional assessments" (GMA).

The Conference regretted that marine assessments and modeling, which have been developed at great cost, have not been reflected in ocean governance. There is a need for political will and support by the global community for the GMA. The Conference calls on all stakeholders' to participate in the use and results of marine assessments for ocean policy purposes.

Future challenges with regard to climate change, particularly with reference to coastal zones, demand integrated governance. Developing countries are severely hampered given their restricted capacity in science, engineering, technology and policy. Small islands are even more vulnerable, given their added position as indicators of change.

The Conference emphasized the need to enhance the capacity of states to actively support and participate in the development of international standards and guidelines for the effective application and enforcement of MARPOL 73/78, in particular work being undertaken by the International Maritime Organization and INTERPOL.

Integrated ocean and coastal governance requires educated people. Raising awareness and bringing the understanding of key processes to the attention of stakeholders and the general public at all levels is a necessity. New educational technologies and methods such as distance learning or the IOI OceanLearn program may help to fill gaps in the educational system.

The Conference called for greater regional cooperation, and sharing of information and data among neighboring countries.

Ocean Security

The Conference noted the increasing threat posed by marine piracy and unlawful acts in national and international waters, to human security and rights, the environment, maritime law, and ocean governance. The Conference called for preparedness to meet the challenge of terrorism on the ocean.

The Conference called on the international community to resolve maritime disputes and, where possible, to act to prevent them, by enhancing:

- Scientific cooperation, especially at the regional level.
- The coordination and harmonization of maritime laws and regulations.
- Mediation and conciliation initiatives.

The tragic situation facing illegal immigrants at sea and those who rescue them needs to be urgently addressed by the international community and relevant organizations of the UN System.

Science, Technology and Policy

Technology is opening new frontiers in the world's oceans potentially for the benefit of mankind. Legislation does not currently support or direct the use of this technology, nor its possible impact on human activities and the ocean. There is a requirement to identify the areas of need for this legislation, and how to implement it. It is essential that the relevant authorities ensure that legislation develops at least as fast as the technology that threatens the sustainability of the ocean. The new technologies being developed for surveillance, monitoring and compliance must be utilized to enforce the law.

The science and engineering community has a responsibility to ensure that governments both national and international are appropriately informed so that legislators may legislate on a basis of sound and reliable knowledge. There is a need for relevant international organizations to provide advice for policy making.

The world community must be educated and, where necessary, trained to understand the developing technologies associated with the oceans. In this way pressure may be brought to bear on national and international governments to take long-term perspectives when developing policy and not the short-term palliatives of political expediency. The priority of educating children at primary and secondary level with respect to the oceans and seas was stressed, and the Conference called on relevant institutions to prepare such education and school programmes.

The potential of traditional ecological knowledge (TEK) should be recognized. TEK has been shown to increase economic opportunities in many developing countries where indigenous people still practice their knowledge in subsistence- based economies.

Marine Natural Hazards

The Conference paid tribute to the coordinating role of the United Nations System in providing an effective response to the Indian Ocean tsunami of December 26, 2004, and expressed gratitude for your leadership. The Conference appreciated the challenge of establishing a Global Warning System. Challenges, with regard to natural marine hazards, will arise at the national, regional and global levels and will require a multiplicity of responses, including:

- The need for marine observations and data collection.

- The need for a global information and expert system for marine natural hazards assessment.
- The need to regularize the systems used for developing advice, including standards and benchmarks, methodologies for long-term tsunami risk calculations and production of the maps of marine natural hazards covering the main at risk areas of the world ocean coastline.
- The development of coordinated mechanisms for conveying warnings and scientific results to the local communities.
- The promotion of education, awareness and resilience with regard to Natural hazards.

Marine natural hazards arise from different sources and in different temporal and geographic scales. Many of them are global, causing enormous damage to coastlines and have major socioeconomic impacts on coastal communities. One of the greatest challenges will be the development of a global, multi-hazards system, with the involvement of governmental and non-governmental organizations as equal partners. Although all recognize the utility of operating within a multi-hazard framework the concept still lacks substance at present. Development of the multi-hazard system is beyond the competence and capacity of any single international organization. There is a need for effective and coordinated framework.

Addressing the problems from the perspective of human security will require a paradigm shift from a reactive approach (post-disaster relief) to a preemptive approach (prevention and preparedness). This corresponds to the conclusions of the Yokahama Conference of the UN International Decade for Natural Disaster Reduction (IDNDR).

Sustainability in Oceans- A declaration made on behalf of the Youth Voice of the World

D. Furnell & S. Zimmerlie

Developed as a result of the Schools' Ocean Forum involving Townsville State High School, St. Patrick's College, Pimlico State High School, The Cathedral School and Heatley Secondary College. Delivered by Dylan Furnell – Year 11 student at Townsville State High School & Skye Zimmerlie – Year 12 Student at St. Patrick's College

Sustainability of Oceans

The purpose of this declaration is to inform you, the members of the International Ocean Institute and participants of Pacem in Maribus XXXI, of the views of the "Schools' Ocean Forum" (Pacem in Maribus XXXI) held in Townsville, 25 October 2005, representing views of our generation on the environmental stability of our world's oceans and what we perceive to be the best solutions for re-establishing sustainability in our oceans.

As representatives of the Youth of the World, we will explore the four areas of sustainability and the importance of the element of equilibrium in each, our current ecological footprint and the five major problems we believe that are affecting our oceans. It will also include our solutions to the current degrading processes being utilised globally.

We would like to present our concerns to you in the hope that you, as members of an international organization, will consider our requests for action, to ensure that there are healthy, productive oceans for us to enjoy and access in providing for OUR children.

The simple fact is that human-kind is destroying our planet including our oceans. It was long believed that we as a species could not make a difference to the oceans of the world. This is false as growing populations and increased industrialization have reduced the oceans resources and have the potential to decimate sea life.

Four areas of sustainability

Balance

To keep our oceans healthy and functioning to their full advantage we need to understand the importance of equality amongst the main key elements of sustainability; Social, Economical, Environmental and Political. If one of these individual elements loses its balance with the other elements, then sustainability as a whole will be significantly affected. This state of imbalance is detrimental to our everyday functions and lives.

At the current point in time, we as youth representatives of the world, believe that the environmental element is being affected by the imbalance of political disassociation of the current issues affecting our oceans. This causes our oceans to be affected. Our perception is that governments, political parties and many regional leaders are refusing to accept the ill health of our oceans and its future fate. The political sustainability element therefore becomes unbalanced, ultimately affecting the environment, with little public awareness and no action being taken by our political parties, to action the rebalancing of the sustainability elements. If our ocean environments are ruined, what hope is there for our economy or our social functions?

We, the youth of the world, would urge you to consider all aspects of sustainability when managing our oceans.

Ecological Footprint

If all the countries of the world lived to the same standards as the most influentially developed countries, then we as global citizens would need five planets the size of Earth to sustain life. This is well above the global resources that we have available. In order for a sustainable future, as global citizens we need to limit the amount of waste, space and material possessions that we create and use.

The ecological footprint is a measure of how much we use of nature. If we cannot measure it, we cannot manage it. To make sustainability a reality, we must know where we are now and how far we have to go. We need to look at the sustainability of nations.

It is the surface of the oceans which determines its productivity, just as the capturing of solar energy and the gas exchanges with the atmosphere are proportional to the surface. Therefore, measuring the ecological activity of the sea by its area instead if its volume makes sense.

361 million km^2 of the Earth's surface is made up of oceans, which correlates to just over 6 hectares per person. Roughly 0.5 hectares out of these 6 hectares harbours over 95% of the ocean's production.

This marine production has already been harvested to the maximum. The reason for this is the fish that people fancy most are high up in the food chain; however the prospects for replenishment of these fish stocks from ocean space remains limited. These 0.5 hectares provides approximately 18 kilograms if fish per year of which only 12 kilograms end up on the 'dinner tables of society'; this secures only 1½ % of humanity's calorie intake.

We the youth of the world would like to have a better understanding of the effects that our ecological footprint has on a sustainable Earth.

Five main areas of degradation of ocean environments

We believe that there are five main areas of our lifestyles that are significantly contributing to not only the destruction of the world's oceans, but ultimately affecting all life on Earth. These are:

1. Global warming
2. Overfishing
3. Coastal settlements
4. Pollution
5. Shipping

<u>Global warming</u>

We, as youths believe the most significant factor playing a role in the destruction of our oceans is global warming. Global warming is a major problem because as the atmospheric layer around the Earth heats up, the ice-caps at the North and South Poles melt. This causes the salinity levels within our oceans to decrease, which results in the change of the density of the water. This is a major problem as it affects some of the most important currents on our Globe; for example the Great Ocean Conveyer Current which is important

as it circulates warm and cold waters throughout the oceans, keeping climates in certain countries steady. However due to Global Warming current patterns are changing causing some countries such as England to grow increasingly colder and countries in the Atlantic near the equator to grow warmer.

Overfishing

The next major problem is overfishing. Some marine species are being completely wiped out as a result of overfishing. This is the case because more fish are being taken out of our oceans before they have the chance to reproduce. This is highly detrimental to not only future fishing but also to the oceans ecosystems.

Coastal Settlement

Another issue that is going to have a fairly significant impact on our generation is the problem of settlements along our coastline. Over 60% of the world's populations live along the world's coastlines. Pollutants from everyday functions are constantly being pumped onto beaches and into waterways. Also many of the world's mega cities are situated along coastlines, dispersing large amounts of pollution into our waterways.

Pollution

We believe that pollution is playing a strong role in the degradation of our world's oceans. This is because the oceans are one of the Earth's major carbon sinks and are only able to hold so much pollution and carbon dioxide before damage is caused. By continually polluting our oceans, we are affecting the health of our Earth.

Shipping

The final problem we believe is ruining our oceans is shipping. On the Australian coastlines this problem is not very evident, however in many European countries and other regions throughout the world, shipping is a main source of that areas income. This may be a good strategy for short term monetary purposes, however the spillage of oils and other fossil fuels, toxic substances and nuclear wastes, propeller damage to marine life and other paraphernalia from these ships can be of great detriment to our oceans.

We, the youth of the world, acknowledge that the issue surrounding the degradation of our oceans cannot be trivialised. We would like to voice our support for the introduction of strategies designed to educate the global community to redress these issues. We would like to make it known that the youth of the world want to participate in this process.

Apply pressure to global governments

We need to get the governments of the world to make a stand and acknowledge that this is situation is serious and that it's not just going to go away on its own. Now our generation needs your help to take it a step further. What we are talking about is PEOPLE POWER!!

We need to combine our efforts, intelligence and willpower in order to reach our leaders and bring about change. Quite often it is evident that a youths voice is heard before their elders, therefore we the youth of the world should be invited to be the vehicles in accessing governments to place pressure on them to act.

Where to from here?

One of the major issues identified during the "School's Ocean Forum" was how to educate older and younger generations on the plight of our oceans. We feel that it is necessary to:

- Show that a little goes a long way i.e. Doing small things such as walking to work can reduce what natural resources we use.
- Don't sugar-coat the message, tell it like it is,
- Promote less emphasis on material possessions,
- Show facts and figures put forward by authority figures to influence a change in hard-held ideas and behaviours, and
- Demand change through the assistance of global governments.

Although these conferences and forums are highly important, we believe that talking can only get us so far. The call for action was voiced many times. Our greatest concern is "When **will** the talking stop and the action start?"

As representatives of the youth of the world, there are many things that we have identified as actions that need to occur at a global level.

- Start with the little things, they can make a difference
- Change our way of life; modify the way of life of the rich and the poor countries so that there is less of a gap between the haves and the have nots, hopefully leading to a more sustainable global community.
- Make appropriate discourses to change the problems we have created with the wrong ones.
- Reduce carbon emissions to reduce global warming and changes to climates which impact on our oceans.
- Find a renewable alternative to fossil fuels.
- Recognize new initiatives. Don't let them be limited by current ideas.
- Don't let new energy sources or ideas for sustainable energy production be restricted or held back by oil giants.
- Involve the global community; we do share this planet.

Action

As mentioned before, our peers' call for action was strong. Globally we acknowledge that action is being taken through organisations such as the IOI. As the youth voice of the World, we would ask you to act on our behalf to:

- Find people who are willing to act and champion the oceans' cause.
- Include the younger generations, as *we* will have to deal with the problem eventually and it will make it clearer if we know what is going on.
- Educate the village instead of the classroom.
- Lobby Governments to input money into research programs such as those run by the International Ocean Institute and the United Nations.
- Encourage global governments to adopt sustainable ocean philosophies and legislate to establish new values for people to follow.

We conclude this by leaving you with these thoughts on what we, the youth of the World, believe to be essential for sustainable oceans.

We need leaders who have vision, rather than leaders who are searching blindly for one. We would implore you as those leaders of vision to enact on our behalf to ensure that oceans are available for us in the future.

Conclusion

We know what the problem is, we know what the solutions are. Let's take action. Let's make a stand for our children. We need to work together as not different countries but as people of the world! We can sit here all day and talk about the problems we are faced with and ways we can handle it, but nothing will happen unless we all get up and take action now!!!

Although we as youth will ultimately have to combat the areas of sustainability, we cannot do it ourselves, we need you as the people with the power to oil the hinges and get the wheels in motion. Let us use this conference to build bridges between the younger and older generations of this world. This conference cannot only make headway, but go down in history as the conference that saved our oceans!

WELCOME

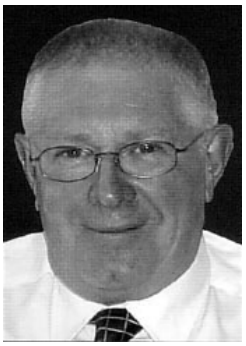
Dr Awni Behnam, President, IOI

In 1982, the ocean received its constitution, UNCLOS, which, by transcending ideological and cultural mindsets, was meant to be a dynamic, comprehensive and equitable framework for global ocean governance. It also codified the core values of the Common Heritage of Mankind, which the late Professor Elisabeth Mann Borgese viewed as the cornerstones of a comprehensive and integrated ocean governance architecture. The four stones are: economic development, environmental protection, peace and ethics. However, an agonizingly prolonged ratification process, changing technology, and geopolitical challenges, all contributed to placing UNCLOS on the back burner: oceans - our very Source of Life - simply fell from the international development agenda.

The IOI thus convenes its 31st Pacem in Maribus to reflect on the theme of Building Bridges Towards Integrated Oceans Governance in an attempt to begin filling this lacuna. It is our hope that PIMXXXI will serve as an opportunity to address the nexus of ocean science and technology, which are fundamental dimensions of ecosystem based ocean governance, and such an approach to governance of the ocean is so fundamental to our sustainable existence.

The eminent expertise and the broad spectrum of stake holders that are gathered here this week will do Elisabeth a great justice. The stakes have never been higher. This unique and timely gathering in Townsville (Australia) affords us all a life time opportunity to be a part of history in the making as we collectively take up the challenge of the millennium. I extend to you all a most warm welcome.

Mr Maurice Storey, President, IMarEST



The Institute of Marine Engineering, Science and Technology, now 116 years old, has as its motto "Per Mare Scienter". The Institute's prime objective, incorporated in its Royal Charter, is 'The scientific development of Marine Engineering, Science and Technology'. It was never more appropriate that IMarEST should partner the IOI in the PIMXXXI Conference theme of 'Building Bridges towards Integrated Oceans Governance'. The Conference highlights the continuum of ocean science and technology and the particular role that advances in technology are bringing to the realities of ocean governance, be it in the field of economic development, environmental protection or policing the seas.

The oceans were never more important to mankind than they are today and the challenges never more daunting. There is little doubt that governments the world over need to be goaded into genuine action in developing ocean governance, an area that has lain quiescent for far too long. Pacem in Maribus XXXI has the opportunity and responsibility to provoke that serious and positive action.'

Message to the Conference

Mário Soares, *Presidente*
(Patron of the IOI)

As Patron of the IOI and, since I was unable as I initially thought, to be present at Pacem in Maribus 2005, it is a great honour for me to have been invited by Dr. Awni Behnam to write a message to the PIM 31 Conference.

As I recalled in the Preface of the Report of the Independent World Commission on the Oceans, which I formed and chaired, the sea has always interested and motivated me – as a citizen and a politician – and I have participated in countless regional and global meetings and conferences with the objective of alerting public opinion, policy-makers and economic agents to the crucial importance of the ocean for the survival of humanity. In the context of the Report, the 1998 Lisbon Declaration made an appeal that is still valid today:

"The prospects for effective governance of the ocean will depend on putting into practice improved ideas, methods of cooperation, institutions and measures of implementation. This is the overriding challenge, in relation to the ocean, that confronts humanity with such urgency at the present time."

The past four decades have been marked by great efforts for the implementation of responsible ocean governance by many fervent and tireless individuals, institutions and organisations – both at the governmental and non-governmental levels. Even though this has been a slow and complex process, a visible contribution has been made regarding a better understanding of the relationship that exists between the ocean and humanity.

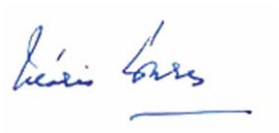
The creation by governments of the IOC, in 1960, and of the IOI, a non governmental organisation, by Professor Elisabeth Mann Borgese, in 1972 – the same year that the Stockholm Conference took place – gave rise to the establishment of other important organisational structures and instruments, namely the adoption, in 1982, of the UN Convention on the Law of the Sea, and, in 1992, the endorsement Agenda 21/Chapter 17 at the Earth Summit, which called for sustainable development and the establishment of a new legal order for the oceans.

Despite the great efforts that have been made for many decades to establish an improved legal framework for sustainable development, equity, peace and security in the ocean, as well as the protection of coastal populations from increasing natural catastrophes caused by climate change, the effective results are frustrating, and many of the barriers to effective ocean governance still prevail. As it was emphasised by the Independent World

Commission on the Oceans, effective ocean governance requires the creation of a flexible and dynamic network of institutions that are coherent and responsive in defining priorities, solving problems and conflicts, and enforcing ocean law. It is crucial that institutions, governments, NGO's and citizens work together towards our common goal: effective ocean governance, on all scales.

I would like to take this opportunity to salute the International Ocean Institute for the tremendous work it has done to promote and advocate the peaceful and sustainable uses of the ocean. Professor Elisabeth Mann Borgese, whom I had the pleasure to meet and work closely with during the sessions of the Independent World Commission on the Oceans, was and will continue to be a symbol of determination and inspiration to all who are committed to this cause.

I am looking forward to seeing the report of the Conference and hope to visit the IOI Headquarters in Malta in the near future to discuss the results with the President and the Executive Director.



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MÁRIO SOARES
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1200-821 Lisbon

Lisbon, 28 October 2005

CONFERENCE OUTLINE PROGRAMME

	Sunday October 30	Monday October 31	Tuesday November 1	Wednesday November 2	Thursday November 3
08.00	Arrivals & registration		Special session **Marine Natural Disasters** Mercure Inn		
09.00		**Opening Ceremony**		**Plenary 3**	**Plenary 5**
09.45		**Plenary 1**		**Plenary 4**	**Plenary 6**
10.00					
10.30		Morning tea		Morning tea	Morning tea
11.00		**Plenary 2**		**Keynote Panels 3, 4**	**Keynote Panels 5, 6**
11.30					
11.45		**Keynote Panels 1, 2**		**Panels 3, 4**	**Panels 5 & 6**
12.00					
12.30		Lunch	Lunch	Lunch	Lunch
13.00					
14.00		**Panels 1, 2**	**Local excursions** or **Melbourne Cup event**	**Panels 3, 4**	**Panels 5, 6**
15.00		Afternoon tea		Afternoon tea	Afternoon tea
15.30		**Discussion panels 1, 2**		**Discussion Panels 3, 4**	**Contributed paper sessions 5, 6**
16.00		**Contributed paper sessions 1, 2**		**Contributed paper sessions 3, 4**	
17.00					**Conference Declaration & Closing Ceremony**
17.30	**Welcome reception Reef HQ**				
18.00					
18.30					
19.00					
20.00		**Elisabeth Mann Borgese memorial lecture by Caryn Anderson**		**Arvid Pardo memorial lecture by Peter Batson**	**Banquet & awards**

OPENING CEREMONY

Monday 31 October 2005
08.30 – 09.45
Ballroom 1, Jupiters Townsville

Master of Ceremonies: Professor Russell Reichelt, CRC Reef, Townsville

Guest: **Senator the Hon Ian MacDonald** (Canberra)
President of IOI : **Dr Awni Behnam** (Geneva, Switzerland)
Director General IMarEST: **Mr Keith Read** (London, UK)
Executive Director, IOI: **Dr Iouri Oliounine** (Malta)
Co-Chair of PIM XXXI: Mr **Dan Brophy** (IMarEST; Adelaide)

Opening Remarks

Dr. Awni Behnam,
President International Ocean Institute (IOI)

Senator the Hon. Ian MacDonald,
Dr. Keith Read, Director General (IMarEST),
Professor Russell Reichelt, Chair, Organising Committee
Dr David Khidasheli, Director WAPMERR
Dr. Iouri Oliounine, Executive Director, IOI
Distinguished Participants and Guests,

It is a great honour and privilege to extend to you all a warm welcome to the 31st Pacem in Maribus Conference. The fact that the 31st Conference is being held in this wonderful city Townsville, the smart state of Queensland and in this fascinating ocean continent of Australia is a testament to the lasting legacy of the founder Elisabeth Mann Borgese.

Pacem in Maribus was first convened by Professor Elisabeth Mann Borgese in 1970 because of her strong belief in the need for a world constitution for the peaceful use of the ocean, hence Pacem in Maribus, to be brought to public attention on the eve of the United Nations Convention on the Law of the Sea (UNCLOS III).

Every conference since then has been part of the history of the evolving governance framework of the Ocean, a parallel non-governmental track to the international system of decision-making and the, regrettably inadequate, ocean governance architecture.

Elisabeth, all her life, was outward looking, engaging others in consensus building and was a strong believer in partnerships. Today, we the IOI family are truly proud to have the Institute of Marine Engineering, Science and Technology (IMAREST) as our partner and stakeholder in the 31st Pacem in Maribus Conference.

This partnership is timely because of the unconscionable neglect of the ocean by the international community as I had occasion to point out last August to the Group of 77 meeting in Jamaica in preparation for the Millennium Summit, and even earlier in the year at the Doha Summit.

Dr. Sylvia Earle in her most recent publication, *Defying Oceans End*, confirmed this grave neglect as she wrote "most puzzling and damaging of all was the widespread indifference to ocean issues, a complacency borne of the lack of awareness among decision-makers and the public at large that the ocean is in trouble, and a profound lack of understanding that there is a direct connection between the declining state of the ocean and human affairs."

The international community is in denial of the disastrous and degraded state of the Ocean. Most telling is perhaps the fact that the Millennium Development Goals totally ignored the ocean. Sadly the report of the UN Secretary General "In Larger Freedom" to the September Summit, let alone the outcome of the largest gathering of leaders ever, did not have a single mention of the ocean. How one can imagine that our world will be "free

from want" –a target of the Millennium Development Goals - if we continue policies that are mentally landlocked and allow the ocean – life's support system -to die from our own folly and neglect?

The international ocean community of the 21st century; the productive sector, the legislative, institutional and societal layers, face an unprecedented challenge in saving the source of life by addressing afresh the critical issues facing the sustainability of the ocean. Linking ocean science, engineering, technology and policy is an imperative ingredient in the interlocking chain of disciplines. Clearly with a fast changing global environment, there is a critical need for a fresh and imaginative architecture of responsibilities of all stakeholders to achieve integrated ocean governance that can guarantee the future of future generations.

Furthermore the lofty ideals of UNCLOS III enshrined in the principle of "Common Heritage of Mankind" demand a holistic approach in its entire interrelated dimension: ethical, economic, social and scientific.

It is relevant to recall that Part XIII of UNCLOS established a new regime for marine scientific research and gave to science and technology a pivotal role in modern governance of the ocean.

About 100 of 320 articles of the Law of the Sea, nearly one third, touch in one way or another on science and science-based technologies.

We are all aware that time, progress and innovation have overtaken the letter but not the spirit of Part XIII. Given that science and technology are fundamental dimensions of ecosystem based ocean governance, this conference provides us with a unique opportunity not only to understand the nature of those linkages in ocean governance but how they may be exploited for the benefit of humankind while safeguarding the majesty of the ocean.

We are all aware that it is the nature of the ocean that pushes science and emerging technologies into the foreground of policy making. They provide the tools to explore, exploit, eco-manage and conserve marine resources; to navigate safely, to protect the coasts, to enrich coastal communities, to promote healthy white water/ blue water linkages, and to ensure security and peaceful use of the ocean.

However we must keep in sight that for science and technology to flourish within a responsible governance framework, it must address the equity dimension of the needs of countries and people, in particular developing countries that suffer the scourge of poverty and are least able to defend themselves, articulate their interests or have affordable access to innovation and appropriate technology. Developing countries also need to internalise scientific and technological capacities.

Decision making in ocean management is dependent on application of scientific technology and engineering tools and thus has direct implications for policy implementation. There is always a danger that such tools may become biased against the interests of developing countries, given the tension between cost and efficiency in the absence of international equitable mechanisms for transfer of technology to developing countries particularly the least developed among them.

If one was to take *ad hoc* examples: the development of double hull tankers, the technology undoubtedly was necessary and imperative. However if single hull obsolete tankers are sold to developing countries and ply the oil trade between those developing countries that have no economic incentive to implement, through port state control, IMO's conventions and protocols, then we would have only shifted the danger to the developing regions of oceans and coasts.

The devastation and tragic loss of life brought about by the Asian Tsunami or the flooding of New Orleans and consequent cost of rebuilding was in part due to ignoring the warnings of the scientific community by the policy makers. It was not that early warning systems or engineering solutions were unavailable. It was the result of a failing in the policy and decision making that cut across the richest and poorest of our international community. It was the result of unabridged gaps between the two disciplines or paradigms. The solutions were available, the policies were not. However we all must share in this unfortunate failure. The civil society also has to bear its share of the blame for not making its voice heard. Here is a lesson to be learnt as we face new and emerging challenges from terrorism and lawlessness on the high seas.

The challenge is how to bring about coherence between policy making and science, technology and engineering solutions that have global benefits and result in a win- win situation for all.

It is amply clear that the nexus of ocean, technology and policy provides the chemistry for sound global ocean governance. Only thus can the international community ensure principles of sustainability, stewardship ecosystem-based management, preservation of biodiversity and accountability become universally applicable.

This conference provides us with a golden opportunity to reassert the complementary role of science, social responsibility, equity and bridging the sustainable development gap in ocean and coast ecosystem governance. Knowledge has always been the key to human development; it can also be the key to saving the ocean and future generations to come.

The rich menu of our agenda for this conference will help us to place the ocean concerns on the international agendas front burner through providing leadership by example by virtue of a partnership (IOI - IMarEST) working for the benefit of the ocean community at large and the empowerment of developing countries in particular.

Thank you.

Opening Remarks

Keith Read
Chief Executive IMarEST

Minister, distinguished guests, ladies and gentlemen, the Institute of Marine Engineering, Science and Technology was founded 116 years ago – its vision is of "a world where marine resources and activities are sustained, managed and developed for the benefit of humanity" and its prime objective, as set out in our Royal Charter, is "The scientific development of marine engineering, marine science and marine technology".

A brief perusal of the outstanding scope and depth of the programme of papers to be read over the next four days is a salutary reminder of how much there remains to be done in building bridges towards integrated ocean governance – the theme of our Pacem in Maribus Conference PIMXXXI.

The conference highlights the continuum of ocean science and technology and the particular role that advances in technology are bringing to the realities of ocean governance. It was never more appropriate that the IMarEST with its motto "Per Mare Scienter" should partner the International Ocean Institute, in organising this conference, and we are privileged and proud to be here in Townsville.

We are particularly proud that it is one of our own Council members, Ms Caryn Anderson, who is to give the Elisabeth Mann Borgese Memorial Lecture on the theme of "Ocean Governance Theory – The Practical Realities" tomorrow night, and we are equally delighted that the IMarEST Council has agreed to the creation of the eighth IMarEST Australia Branch, here in Townsville; with Professor Russell Reichelt, the Chief Executive Officer of CRC Reef Research Centre and the Chairman of this Conference, as its first Chairman, and with Neil Connell, the IMarEST Townsville representative, as its first Secretary.

The oceans were never more important to mankind than they are today and the challenges never more daunting. Ocean governance has been quiescent for too long. In this joint IOI and IMarEST conference we have the opportunity and the responsibility to make our voice heard by governments national and international, and to provoke serious and positive action. Welcome to Pacem in Maribus XXXI – enjoy it.

Opening Remarks

Senator the Hon Ian Macdonald
Minister for Fisheries, Forestry and Conservation

Thanks very much Russell, and good morning ladies and gentlemen. I am delighted and honoured to be invited to open this very important conference. It is a great honour to address such an eminent group of scientists, engineers, technologists and policy makers.

It's also great to see Russell Reichelt as the Master of Ceremonies in his role as Chief Executive Officer of the CRC, the cooperative research centre for the reef in Australia.

My association with Russell goes back more than 10 years. Russell does chair the group that developed Australia's oceans policy, and I will talk about that later, and is now, as I understand, on the board of the International Ocean Institute.

As the opening speaker, I do have the pleasure of welcoming Dr Awni Behnam, President of the International Ocean Institute, and Keith Read, the Director-General of the Institute of Marine Engineering, Science and Technology (IMarEST) which is co-sponsoring this conference. The Institute recently moved into science, realising that important link between science, engineering and technology, and does include, I understand, a number of marine scientists among its members.

Welcome also to Dr Iouri Oliounine, IOI's Executive Director, Dan Brophy of IMarEST, the conference co-chair; I also recognise Professor Robin South, the Director of IOI in Australia and Dr Clive Wilkinson, the Principal Scientist for the Australian Institute of Marine Science. I particularly pay tribute to the City of Townsville Council for putting on the welcoming function last night and for the great work it does in supporting the many institutions around the city, who do support science, particularly in the marine area.

I do want to also recognise a very important guest you have with you today and it's David Khidasheli from the World Agency of Planetary Monitoring and Earthquake Reduction - all the way from Switzerland. It's great to have David with us at this conference.

And, of course, I welcome all of you who are participants in this conference, more than 60 per cent of whom, I'm told, are from beyond Australia.

I'm pleased to see so many Australian Government-funded agencies as sponsors of your very important conference.

The theme of your conference - *Building Bridges towards Integrated Oceans Governance* - is close to my heart for many reasons. I do have a long association with the oceans and the sea during my parliamentary career; and, presently, as Minister for Fisheries. I am a coastal dweller and share my home base in Townsville with the Australian Institute of Marine Science, the Great Barrier Reef Marine Park Authority, James Cook University, just to mention three of the great scientific institutions, which do so much marine research in Australia.

The oceans provide us with food and energy, and new pharmaceuticals that hold the promise of other benefits, such as cures for cancer. In return, they demand we apply

sustainable policies based on best practice and best knowledge. We must also exercise caution in the approach we take.

Australia, like many other nations, recognises the resources of the oceans are finite and under pressure. I am not just referring to the effects on the oceans' many fish species. We must also take into account the other users, such as offshore oil and gas, shipping and bio-prospecting. They require an integrated framework if we are to benefit from their potential.

In 1998, the Federal Government produced the nation's Ocean Policy. It was our first comprehensive attempt to adopt a larger, ecosystem-based management approach to Australia's Exclusive Economic Zone. The policy reinforces the argument that managing the resources of the ocean requires an integrated approach. Through it we can meet the multiple objectives of environmental, social and economic good that depend on the long-term sustainability of the marine environment.

We are developing regional marine plans to integrate sustainable development into Australia's oceans governance.

Australia's regional marine planning is an ambitious, world-leading programme. A couple of weeks ago, the Government announced it would take regional marine planning to a new level by working in larger bioregions and giving it a statutory basis under Section 176 of the *Environment, Protection and Biodiversity Conservation Act 1999.*

The plans will prove a comprehensive source of information about the marine environment of each region. They will go further than describing its marine life and processes: They will identify existing human threats and pressures on the environment. And the plans will identify conservation priorities for the regions, and give the Government a platform to manage the marine environment for many years.

Importantly for fisheries management, in terms of multiple-use determined by gear types, it is also providing an opportunity for fisheries associations to undertake change. In everything that the Australian Government does for ocean management and conservation we're careful to manage sensibly. I might say, for those of you who are interested in the bottom-trawling debate which is raging at the moment that Australia believes it is not appropriate to ban bottom trawling at this stage.

We don't like bottom-trawling, but we believe it is inappropriate where there is no governance of the high seas that can enforce the ban or moratorium. Until you get the high seas governance in place, banning bottom-trawling stops the good guys from going out and fishing, but has no impact on the majority who do fish the seas and pay no attention whatsoever to the rules that have been made. We want to make sure that, as a nation, we do get the governance process right, and then we will ban bottom-trawling.

Ladies and gentlemen, last year, to further Australia's understanding of it and to create sustainable wealth from Australia's oceans, the Australian Government embarked on the country's biggest collaborative research enterprise. We are going to provide some $305 million over several years to our Wealth from the Oceans flagship.

Our goal is to position Australia, by 2020, as an international leader in delivering economic, social and environmental wealth based on our understanding of the oceans' systems and processes.

Ladies and gentlemen, it is timely, perhaps, and appropriate, that many of you are able to take part in tomorrow's discussions on marine natural hazards. There could be no more sobering reminder of the immense power of the oceans than the catastrophic tsunami that struck South East Asia and the Indian Ocean on Boxing Day last year.

I'm pleased to say Australia, especially through the technical expertise of the Bureau of Meteorology and Geoscience Australia, is a significant contributor to international efforts to implement a tsunami warning system in the Indian Ocean. We are making our contribution under the guidance of UNESCO's Intergovernmental Oceanographic Commission. To help address the tsunami threat, our Government will provide some $69 million over the next four years to establish a national tsunami warning centre that will draw on Australia's scientific and engineering capacity.

I do want to commend the International Ocean Institute, and the Institute of Marine Engineering, Science and Technology, for the excellent work that each of those two organisations does in promoting the effective application of science, technology and engineering in the public interest.

Ladies and gentlemen, you do have a very full programme ahead of you dealing with a wide range of oceanic issues, all concentrating on the peaceful use of our oceans.

I note from your programme many matters that are of particular interest to me as the Australian Minister for Fisheries. Your opening theme of good governance on the high seas, looking at piracy and the common responsibilities of states to threats to the marine environment, which Professor Jon Van Dyke will deliver shortly, is one that I am sure will be particularly interesting.

I see later on the Arafura-Timor Seas issue is to be discussed, and there is a presentation on the islands of the Pacific and how lessons can be learnt from coastal fisheries - making me proud that Australia is so involved in the Forum Fisheries Agency, a group of Pacific island countries getting together in the western and central Pacific to look after the governance of fisheries.

I note, also, discussions on the Arafura-Timor Seas. I will be meeting with the Indonesian and Timorese Ministers just next month to further that. I note that one of your speakers is Dr Merrilyn Wasson, who is the Regional Coordinator of the Arafura-Timor Seas Environment Forum which is involved with the science of that particular area.

I also note that the head of our engineering and finance section of the National Marine Unit of the Australian Customs Service will be speaking to you about the great work our customs marine organisation does along with the Australian navy in becoming, as your conference seems to suggest, a maritime constabulary enforcing legislation protecting our fisheries, our science and our conservation areas, as well as our quarantine and immigration, and we are very, very proud of the work our Customs Service does in that regard.

Some of you may recall, a couple of years ago, that our Customs and Fisheries officers took chase of an illegal fishing vessel the '*Viarsa*' across three oceans down near the Antarctica, eventually catching up with it. All of that demonstrates the great work that our Navy and our Customs and Fisheries officers do.

I note another paper on surveillance and enforcement of maritime laws, and use of monitoring systems. All very important to fishers for the good governance of the oceans, and also I note that there is going to be a presentation on the changing role of maritime law and policies. I would hope that, as the time progresses, we are able to get some new additions to the Law of the Sea convention that makes the fight against illegal fishing easier to win. I am particularly concerned at the lack of a jailing provision under UNCLOS, which I think sends a signal to illegal fishers around the world that the global community doesn't treat illegal fishing as a serious crime.

That's one of the many amendments I'd like to see to UNCLOS.

Ladies and gentlemen, there is another item on your agenda of special interest to me as Minister for Fisheries, and that is, as I mentioned previously, high-seas governance.

Australia fully acknowledges the conflict management problems of the high-seas governance. High-seas are a shared resource and do require international cooperation and support if we are to have an effective management regime. Having strong governance means being better able to control illegal unreported and unregulated fishing.

IUU fishing is a significant problem for Australia, and we have taken, and will continue to take, a strong stance against it. We are concerned about the effect of increased illegal fishing on the sustainability on the world's fish stocks and the marine environment.

As a responsible fishing nation, we have adopted measures to prevent Australian involvement in IUU fishing and trade. And we will continue to work closely with other like-minded countries to attack the problem on the water and in ports. I am one of the members of the ministerial taskforce which, next March, will release the results of three years work in getting practical measures in place to try and address illegal fishing on the high seas.

The High Seas Taskforce, established under OECD, came together as a result of the frustration of responsible fishing nations in fighting IUU operators. We wanted to have practical measures in place to enable us to do something about IUU fishing on the high seas, not just sit around and talk about it. We do see a good high seas governance regime as a key step in winning the fight against IUU fishing.

Many states, unfortunately, haven't adopted the many International Covenants that are around, that should, and could, regulate fishing and governance of the high-seas. The fact that some states have not adopted them has reduced their effectiveness, thus allowing operations outside their mandates in contravention of the fisheries international laws.

Indeed, just next Wednesday, during the CLAMLR conference currently going on in Hobart in Tasmania, I'll be along with the WWF and the International Maritime Workers Association, releasing a report on flags of convenience (FOC) boats and what we can do about their operators.

In fact, I hope that's a report that many of you will read; that will encourage you to join with us and others in trying to do something about IUU fishing by boats carrying FOC flags.

Ladies and gentlemen, if we are to build bridges towards integrated oceans governance we must properly manage our fisheries. Scientific research on the high-seas is increasingly important. We need to continue this research to understand high-seas biodiversity. We need to identify particular pressures and vulnerabilities. We do need to support management and assess the effectiveness of our management options.

I know only too well the prohibitive cost of dedicated research cruises to collect the data we need. A research vessel like Australia's *Southern Supporter*, for example, costs about $40,000 a day to keep at sea. These vessels do have limits on what they can do, so it's certainly in everyone's interest to work together to develop alternative strategies to obtain this information.

In Australia, we do place observers on commercial fishing vessels. Apart from carrying out their normal duties at sea, they also collect biological samples for ecosystem studies. The observers need more advice on what samples they should be collecting.

An important point that - as scientists - you might consider, is establishing a network to store and analyse the samples and to share the results. It's not overstating the case to say we are running out of time. Important fish species, such as orange roughy, hoki and Patagonian toothfish - to name just a few, are certainly under pressure.

There is an expectation that scientists, with enough time and resources, will gain an understanding of ecosystem interactions and will be able to predict ecosystem responses to changes such as fishing.

Ladies and gentlemen, like the governments of each of your countries, I am looking forward to drawing on the results of your collective wisdom, expertise and experience.

What you contribute will allow governments around the globe to better understand, better manage and better use their oceans, and work cooperatively to save the high seas from over-exploitation.

Ladies and gentlemen, I won't hold you up any longer; I know you have a lot to do in the next couple of days at your conference. But certainly, again, my congratulations to the conference organisers and a very big north Queensland warm welcome to all of you here. I do hope, as well as the hard work you're doing, that you'll find a little time to have a look at Magnetic Island, the rainforests and some of the other attractions of north Queensland.

With that ladies and gentlemen, it gives me great pleasure to open the 31st Pacem in Maribus conference.

Good luck.

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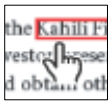

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MR JOSEPH N. KAMAU, Marine and Fisheries Research Institute, Mombasa, Kenya. T*he anthropogenic influence to the fate of selected heavy metals at the backwaters of Makupa Creek, Kenya*

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THEME II: Coastal & Marine Activities: Environmental, Social & Economic Impacts

The coastal and marine environment has long been a source of food, wealth and a means of transport but what are the limits of these resources and what are the impacts of our activities on the coastal and marine environments if they are not managed appropriately? Given the continuing decline of our coastal and marine resources and the dependence on these environments in developing nations, is there an opportunity to learn from the developing world and better manage the social, economic and environmental impacts of human activities?

Plenary: HON VIRGINIA CHADWICK, Chair, Great Barrier Reef Marine Park Authority [paper presented by **DR DAVID WACHENFELD].** *Management of the Great Barrier Reef.*

Chair: **PROF. ALAIN PIQUEMAL.**

Rapporteurs: Kimberly Belfer, Sarah Patton & Jackie Wang.

Keynote: DR TORSTEN MOLLER, Managing Director, International Tanker Owners Pollution Fed. *Integration of scientific perspectives in the application of maritime law.*

Panellists:

MS FRAN HUMPHRIES, Senior Policy Officer, Department of Primary Industries, Queensland Government. *The scientific foundations of marine resource management law and policy – a Queensland perspective.*

DR VIKTORIYA RADCHENKO, Executive Director, IOI-Ukraine. *Eutrophication as ecological results of human activity. Case study – Sevastopol Bay.*

DR NASSER ZAKER, IOI-Iran. *Marine pollution inputs and priorities along the Iranian Coastal Areas in the Caspian Sea.*

Discussion Theme II

CONTRIBUTED PAPER SESSION II: Ocean Learning

Chair: Dr Werner Ekau, Director, IOI (Germany)

Papers:

G. ROBIN SOUTH, Director, IOI (Australia). *IOI-OceanLearn – Learning for our future ocean.*

TAVIS POTTS, Australian Expert Group in Industry Studies, University of Western Sydney. *Sustainability indicator systems – success or failure in a marine policy context.*

MARTIN COCKS & R. KNIGHT, IOI (SOUTH AFRICA), *Web-based spatial information system for improved coastal management and governance.*

ALEXANDER IVANOV, IOI Operational Centre Volga, Nizhniy Novgorod, Russia. *Structured indicators for natural disasters risk and vulnerability assessment.*

JAGJIT SINGH, Faculty of Islands and Oceans, University of the South Pacific. *Indo-Fijian fishing village of Vatoa, Ba: a socioeconomic survey.*

Discussion CPS II

THE ELISABETH BORGESE MEMORIAL LECTURE; **CARIN ANDERSON,** *Ocean Governance theory – the practical realities*; Chair: Dr Awni Behnam;

SPECIAL THEME: Marine Natural Hazards

The tsunami in the Indian Ocean on 26 December 2004 was a stark reminder of the power of natural disasters. This theme will address marine natural disasters including tsunamis, tidal surges and cyclones and their impact and implications, especially on vulnerable coastal communities, and the role that the IOI and its partners might play in raising awareness and in helping to alleviate impacts in the future

Chair: DR IOURI OLIOUNINE, Exec. Director, International Ocean Institute, Malta

Rapporteurs: Melanie Blanchette; Putu Liza; Andrew Scardino

Panellists: DR JUAN CARLOS BRANDT (S BRICEÑO), United Nations Information Centre, Sydney**.** *The Hyogo Framework for action 2005-2015: Building the resilience of nations and communities to disaster, an essential component in oceans and coastal management*

PROF NEVILLE SMITH, Chief Scientist Bureau of Meteorology**.** Vice-Chair of IOC – UNESCO**,** *The role of the IOC in Marine Natural Disaster Warning and Mitigation*

DR VIACHESLAV GUSIAKOV, Head, Tsunami Laboratory, Russian Academy of Science, Russia. *Tsunami hazards and risk assessment for the world ocean coasts*

PROF TAD MURTY, Adjunct Professor, Department of Civil Engineering, University of Ottawa, Canada. *Bay of Bengal – the place where hazards are born*

DR WERNER EKAU, Director, International Ocean Institute, Germany. *Indian Ocean tsunami – coral reefs destruction (video presentation)*

PROF ALEJANDRO GUTIERREZ, Director, International Ocean Institute, Costa Rica. *Intra-America marine natural hazards: proposal for a warning system*

PROF EDUARDO MARONE, Director, International Ocean Institute, Southwest Atlantic, Brazil. *Development of hazards monitoring system in an effective and not expensive way – Brazilian experience*

MR KARTLOS EDILASHVILI, Senior Technical Advisor, World Agency for Planetary, Monitoring and Earthquake Risk Reduction, Switzerland. *Information systems and high resolution satellite images for natural hazard risks calculation and vulnerability assessment*

DR CLIVE WILKINSON & N. PHONGSUWAN, Australian Institute of Marine Science and Phuket Marine Biological Station. *Ecological and socio-economic implications of marine natural hazards: impacts of the December tsunami in the Indian Ocean, especially Thailand*

DR CHERDSAK VIRAPAT, Director, International Ocean Institute, Thailand. *Establishment of the National Disaster Warning Centre – Thai experience*

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THEME III: Technology, Surveillance & Enforcement of Maritime Activities

Technological advances in position fixing, communications, integration of sensors and intelligence management and monitoring systems have radically advanced the 'best practice' benchmarks for managing and monitoring maritime activities, particularly in surveillance and enforcement of maritime laws and regulations. It is important that these technological advances are linked with changing policy and legal arrangements in an effort to ensure effective management of maritime activities at local, national and international levels.

Plenary: MR KEITH READ, Chief Executive, Institute of Marine Engineering, Science and Technology, United Kingdom; *Maritime surveillance – global perspective*

Chair: DR AWNI BEHNAM, President, International Ocean Institute, Switzerland
Rapporteurs: Melanie Blanchette; Liliana Ortiz Guerra; Putu Liza
Keynote: MR PAUL NELSON, Manager, Environmental Protection Standards, Australian Maritime Safety Authority, Australia. *Enforcement perspectives on maritime and environmental law and policy*
Panellists: MR GREG HELLESSEY, Head, Engineering and Finance Sections, National Marine Unit, Australian Customs Service, Australia. *Customs as a maritime constabulary enforcing the legislation of organisations such as GBRMPA, AFMA, DIMIA, AQIS, etc, environmental protection and security from a law enforcer's perspective*
DR NEIL GRIBBLE, Principal Fisheries Biologist, Queensland Department of Primary Industries and Fisheries, Australia, **D. PEEL AND N. GOOD.** *Innovative fisheries resource assessment and fishing effort mapping using satellite based VMS*
MR JIM HUGGET, Maritime Safety Queensland, Australia. *Delivering enhanced vessel safety in the Great Barrier Reef* [The paper was presented by **MR PAUL BRANDENBURG**, Maritime Safety Queensland]
MS MARY ANN PALMA, University of Wollongong, NSW, Australia. *A review of the monitoring control and surveillance framework in the Philippines*
MR STEVE PELECANOS, Vice-President of the International Maritime Pilots' Association, Director of the Australian Marine Environment Protection Association, Director of the Australian Maritime Network. *Advances in navigational technology – the importance of practical experience*

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CONTRIBUTED PAPER SESSION III: Marine Pollution
Chair: DR KIM PROCHAZKA, Director, International Ocean Institute, South Africa
PAPERS: PROF. ALENKA MALEJ, V. TURK, V.D. PURTLE & K.D. BLACK, IOI, Slovenia. *Reducing the impact of cage mariculture: can artificial substrates help?*
MR ZHOU XIAOJIAN, H. OKAMURA & S. NAGATA, Research Center for Inland Seas, Kobe University. *Single and joint toxicity of some new antifoulants against Vibrio fisheri by bioluminescent assay*
MR CHENXIANG WANG, Research Center for Inland Seas, Kobe University. *Downshock effect on the substrate uptake in the halotolerant Brevibacterium sp. JCM 6894*
MR MARK NENER, Water Corporation. *The Water Corporation's Perth Long-term Ocean Outlet Monitoring program (PLOOM)*
DR VF ZAJTSEV, M.V. PAVLOVA, IOI, Caspian Sea. *Ecological safety of Caspian Sea*
MS NOVERITA TAKERINA, D.R. BROWNE, M.J. RISK, University of Jakarta, Indonesia. *Speciation of heavy metals in sediments of Semarang, Indonesia*

THEME IV: Global Marine Assessments & Models for Alternatives
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Plenary: DR MICHAEL HUBER, Senior Partner, Global Coastal Strategies, Australia
Global marine assessment: the next phase

Chair: DR JOELI VEITAYAKI, IOI Pacific Islands
Rapporteurs: Roger Beeden; Jeremy Goldberg; Sarah Patton
Keynote: DR CLIVE WILKINSON, Australian Institute of Marine Science and Global Coral Reef Monitoring Network. *Lessons from the Global Coral Reef Monitoring Network for Global Marine Assessments*
Panellists: DR BILL ERB, Head, IOC Perth Regional Program Office, Australia. *GOOS regional alliances in delivering operational oceanography*
DR ALDO DRAGO, Executive Secretary, MedGOOS and Director, International Ocean Institute Malta. *MedGOOS – achievements in operational oceanography in the Mediterranean region*
MR DAVID SOUTER, University of Kalmar, Sweden. *Global International Waters Assessment – experiences gained and lessons learnt*
DR ULF LIDMAN, University of Kalmar & Director, International Ocean Institute, Baltic Sea. *Global International Waters Assessment – the future*
MR STEVE RAAYMAKERS, Director, EcoStrategic Consultants, Australia. *Maritime transport and global marine assessments: out of sight and under-stated?*
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Chair: Dr Clive Wilkinson, Australian Institute of Marine Science and Global Coral Reef Monitoring Network
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MR PAT J. HIGGINS, W.W. READ & S.R. BELWARD, James Cook University. *Finite amplitude waves near coral reefs*
DR WAYNE W. READ, T. STIEGLITZ & D. HOLLIDAY, James Cook University. *Modelling submarine groundwater discharge at Elim Beach. Modelling sediment deposition near coral reefs*
MR ANDREW J. SCARDINO, School of Marine Biology & Aquaculture, James Cook University. *Novel antifouling surfaces modeled from nature*
MR GREG BRUCE, Townsville City Council. *Fostering partnerships and ownership from Creek to Coral: demonstrating effective community-based management and involvement in catchment management*
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THE ARVID PARDO MEMORIAL LECTURE, **PETER BATSON,** *Spare a thought for your local abyss* Chair: Prof G. Robin South

THEME V: Arafura and Timor Seas

The semi-enclosed seas between Australia, Indonesia, Timor-Leste and Papua New Guinea are an important shared resource for these coastal states and the local communities that depend on them. In addition to major marine industries such as offshore oil and gas and fisheries, there are small scale industries such as low-technology aquaculture, and subsistence harvesting. Illegal fishing and sustainable resource use in general are important challenges. Research cooperation, knowledge sharing and integrated management are increasingly important.

Plenary: DR MERRILYN WASSON, Regional Coordinator, ATSEF, Australia. *The role of Arafura-Timor Seas Environment Forum (ATSEF)*

Chair: MR DAN BROPHY, Divisional Secretary, Institute of Marine Engineering, Science and Technology, Australia

Rapporteur: Kimberly Belfer

Keynote: **DR DAVID MCKINNON,** Australian Institute of Marine Science. *The Timor Seas: an AIMS Perspective*

Panellists: **DR JOELI VEITAYAKI,** Director, International Ocean Institute – Pacific Islands, University of the South Pacific, Fiji. *From one island to another: lessons from coastal fisheries development in the Pacific Islands*

DR DAVID WILLIAMS, Director CRC Torres Strait, Australia. *Research priorities for the CRC Torres Strait*

MS PUTU LIZA KUSUMA MUSTIKA, James Cook University. *Linking the two seas: lessons learned from Savu Sea (Indonesia) for marine mammal conservation in Timor Sea*

PROF RUSSELL REICHELT, Chief Executive Officer, CRC Reef Research Centre, Australia. *Summary of theme and discussion*

Discussion Theme V

THEME VI: Marine Biotechnology – Challenges and Prospects

Marine Biotechnology is a major focus in marine science and technology, and while much progress has been made, issues of policies, guidelines and their implementation remain problematical in many developing countries. The potential for commercialisation of marine natural products is an area in which Australia is very active.

Plenary: DR CHRIS BATTERSHILL, Australian Institute of Marine Science. *Reef to Royalty – issues in marine biotechnology*

Chair: MR PETER MELLOR, Director, State Development and Innovation Centre, Townsville, Australia

Rapporteur: Vanessa Valdez Ramirez; Andrew Scardino

Keynote: **DR PETER ISDALE,** Chief Executive Officer, IMBCom Pty Ltd, University of Queensland, Australia. *From reef to the market – the commercialisation of bioactive compounds*

Panellists:

MS ELIZABETH EVANS-ILLIDGE, Australian Institute of Marine Science. *Accessing the innovation in nature and sharing the benefits – in pursuit of CBD compliance*

MR STAN LUI, Indigenous Aquaculture Extension Officer, Queensland Department of Primary Industries and Fisheries, Australia. *Indigenous perspective on bio-prospecting*

DR BRETT KETTLE, Director, Toxitech, Australia. *Practical experiences in the development of commercial opportunities in marine biotechnology*

PROFESSOR ROCKY DE NYS, James Cook University, Australia. *Development of antifouling technologies – biomimetic fouling control*

Discussion Theme VI

POSTER PRESENTATIONS:

MR ROGER BEEDEN, James Cook University and Reef Check Australia. *Reef Check Australia – The Great Barrier Reef Project*

MS MELANIE BLANCHETTE, James Cook University. *The impact of copper on esterase activity in Tetraselmis sp. (Chlorophyta), and its potential as a bioremediator for metal pollution*

MR JEREMY GOLDBERG, James Cook University. *Long-term study of coral reef morphological diversity: applications for monitoring and management*