Third International Dialogue on Underwater Munitions

April 13-15, 2011— Sopot, Poland

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PROGRAM

Contents

Welcome to the **Third International Dialogue** on Underwater Munitions

I would like to take this opportunity to welcome everyone to the Third International Dialogue on Underwater Munitions in Sopot, Poland on the Baltic Sea. The main focus of our past dialogues were on the Canadian and United States littoral waters including the Greats Lakes and the Hawaiian Islands. In Europe the main dumping areas are in the Baltic Sea, south-east of Gotland (south-west of Liepaja), east of Bornholm and south of Little Belt. The Baltic Sea requires special considerations due to its small size, shallow depth, young geologically age and almost stagnant waters. Some experts believe the volume of munitions dumped or abandoned in the Baltic Sea are much higher than reported and that the impact on human health and the environment is far greater than originally believed.

In order to update information and monitor construction of the gas pipeline on the Baltic seabed, HELCOM Ministerial meeting established an Experts Group led by Germany and Poland. Recently global support was sought by Lithuanian Diplomats including support at the United Nations with the Passing of the UN Resolution on Sea Dumped Chemical Munitions (see page 2) by all Member States. The UN Resolution will seek to put equal footing for Sea Dumped Chemical Munitions that presently exists for Land-Stocked Chemical Munitions.

It is important to understand the history of underwater munitions, to explore relationships among international stakeholders, and to build on the experiences and information that will be shared in this forum. An integral component of the Dialogue will be a series of private meetings where political and executive international leaders may meet to discuss areas of common interest and concern and to work toward resolutions.

I hope and trust we can all learn from each other's experiences to reduce duplication of research and development by creating partnerships and working together both now and in the future. Our intention is to have an appreciative dialogue where we can reach positive out comes through collaborative consultation. I would encourage everyone to constructively engage with one another to better understand the unique position we each may face. I wish everyone a most successful Dialogue for together we can achieve the extraordinary!

Sincerely,

Terrance P. Long CPSM. SSM. CD.
Chairman, IDUM

Third International Dialogue on Underwater Munitions

April
13-15
2011

Sheraton Hotel
Conference Center
& Spa

WELCOME

Welcome to the Dialogue

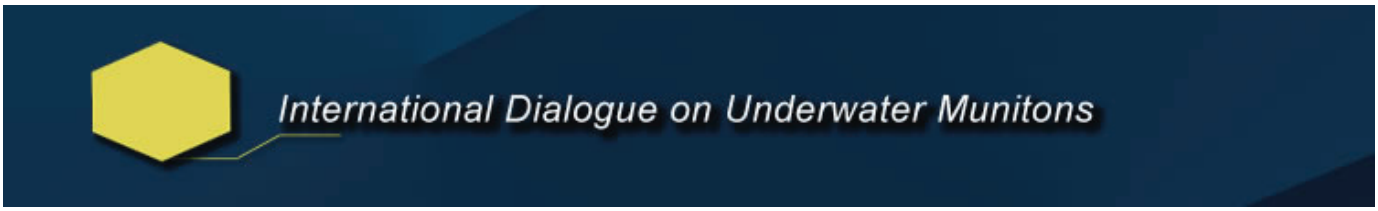
When I came to the Second International Dialogue on Underwater Munitions held in Honolulu (Hawaii) two years ago I could never imagine that the next one will be organized in Poland . Then almost alone as a speaker I wanted to raise awareness about dumped chemical munitions in the Baltic waters, a far distant and almost unknown sea among the most of that Dialogue participants, and warn about the excessive investments planned on its bed. In my keynote address then I compared the Dialogue community as a loose one but devoted and having strong interest to be listened world-wide.

Today I have the honour and privilege to host you in Poland and warmly welcome you at the Baltic coast. In only two years we had a long walk but how successful it was. We got the important support from international fora (e.g the Council of Europe and the UN), which both passed the relevant resolutions claiming action and from the HELCOM community as well. The latter restored its Expert Group on the issue titled HELCOM MUNI, which certainly would monitor the impact of economic activities on the Baltic. To sum-up our community has grown and our working infrastructure has been better organized and extended. We are not anymore walking alone.

And finally the Third Dialogue crossed the Pacific, then the Atlantic and the North Sea and safely accosted in Sopot having unconditional support from both, our Minister of Foreign Affairs and Minister of Environment. Wishing you the fruitful debate and mutually beneficial exchange of views at the present Dialogue may I thank to all who contributed to make it happened and particularly to all members of the International Scientific Advisory Board on Sea-Dumped Chemical Weapons and my Co-chair.

Sincerely,

Dr. Andrzej Jagusiewicz
Co-Chairman, IDUM



THIRD INTERNATIONAL DIALOGUE ON UNDERWATER MUNITIONS
SOPOT, POLAND, APRIL 13-15, 2010

The Third International Dialogue on Underwater Munitions will serve as a premiere global forum for underwater munitions information exchange on the topics of Policy, Science, Technology and Economics of investing in our marine resources. Munitions can be found in every ocean of the world including many of our lakes, rivers and streams. Munitions can be found in a reservoir in Jakarta, Indonesia to the pristine lakes of the Swiss Alps at the foot of the Edger to the Great Lakes of North America or the Adriatic, Black or Baltic Seas.

In addition to keynote session, panels and scientific presentations, this global forum for underwater munitions exchange will address the topics of underwater technology and best practices; assessments of underwater sites and updates on progress and findings; and research from academia and policy experts on information directly relevant to underwater science and the future. It will be important to understand the history of underwater munitions, to explore relationships among international stakeholders and build on the experiences and information that will be shared in this forum.

Your input is important to help better understand the potential impacts on human health and the environment associated with all classes of marine dumped munitions. Some abstracts presented at the Dialogue will be chosen by the International Scientific Advisory Board (ISAB) for further presentation as Papers in the Marine Technology Society Journal's Special Issue on the Legacy of Underwater Munitions: The Science, Technology and Policy of Underwater Munitions (www.mtsjournal.org). The MTS Journal is the International, Interdisciplinary Society Devoted to Oceans and Marine Engineering, Science, and Policy. If space is available additional consideration for Papers will be given to previous presentations at the IDUM's in Halifax, Nova Scotia, Canada and Honolulu, Hawaii, USA and the Underwater Conference in Neumunster, Germany in 2010 for: Minimizing Risks for the Environment in Marine Ammunition Removal in the Baltic and North Seas. The ISAB values everyone's input and may consider additional manuscripts and commentaries for technology, research, assessment, strategies to mitigate adverse environmental impacts; and cases studies from individuals, groups and organizations.

Third International Dialogue on Underwater Munitions

April **13-15** 2011

Sheraton Hotel Conference Center & Spa

WELCOME

Registration and Information Desk

The Registration and Information Desk will be located in Grand Foyer A of the Sheraton Hotel Conference Center & spa. This desk will be open throughout the Dialogue if you should need directions or have any questions. If you have a personal or professional emergency during the Dialogue, please see our Registration Desk for special assistance.

If you have not yet paid your registration fees for the Dialogue, you may do this at the **Registration/Information Desk**

The **Registration Desk** hours are:
Wednesday, April 13 ..... 18:00 - 20:00
Thursday, April 14 ..... 07:00 - 18:00
Friday, April 15 ..... 07:00 - 18:00

Message Board

To promote networking during the Dialogue a message board is located near the registration/ information desk. We encourage you to check the board daily for updates and messages.

Name Badges

Dialogue delegates must wear name badges for access to sessions and social functions. Should you misplace your name badge, please obtain a replacement badge at the registration desk.

Dress

Business casual dress is recommended for all Dialogue activities.

Business Center

High-speed internet access, computers, scanners, faxing, postal and office supplies as well as photocopying are some of the services and equipment available. User fees apply.

Concierge

Conveniently located next to the front desk, a multilingual and knowledgeable team at the Concierge Desk welcomes the opportunity to assist with reservations and provide local information on shopping, cultural activities, sightseeing, dining, entertainment and other interests.

April 13th

Plan to join us on Wednesday evening for some early networking.

Evening Reception April 13, 16:00 - 18:00 In Bar Rotunda

The International Dialogue on Underwater Munitions would like to take this opportunity to invite to an evening reception hosted by the Polish Government and our Co-chair and Chief Inspector of Environmental Protection of Poland Dr. Andrzej Jagusiewicz.

United Nations A/C.2/65/L.32/Rev.1

General Assembly

Distr.: Limited
24 November 2010

Original: English

Sixty-fifth session
Second Committee
Agenda item 20
Sustainable development

Austria, Azerbaijan, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Ecuador, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Monaco, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Somalia, Spain, Sweden, Ukraine and United Kingdom of Great Britain and Northern Ireland: revised draft resolution

Cooperative measures to assess and increase awareness of environmental effects related to waste originating from chemical munitions dumped at sea

The General Assembly,

Recalling the recommendations of the United Nations Conference on the Human Environment,[1] held in Stockholm in June 1972,

Noting relevant provisions of Agenda 21,[2] adopted at the United Nations Conference on Environment and Development in Rio de Janeiro, Brazil, in June 1992 and reaffirmed in the Plan of Implementation of the World Summit on Sustainable Development ("Johannesburg Plan of Implementation"),[3] adopted in Johannesburg, South Africa, in September 2002,

Recalling relevant international and regional instruments such as the United Nations Convention on the Law of the Sea,[4] the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter,[5] the Convention for the

[1] See Report of the United Nations Conference on the Human Environment, Stockholm, 5-16 June 1972 (A/CONF.48/14/Rev.1).

[2] Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992, vol. I, Resolutions Adopted by the Conference (United Nations publication, Sales No. E.93.I.8 and corrigendum), resolution 1, annex I.

[3] Report of the World Summit on Sustainable Development, Johannesburg, South Africa, 26 August-4 September 2002 (United Nations publication, Sales No. E.03 II.A.1 and corrigendum), chap. I, resolution 1, annex.

[4] United Nations, Treaty Series, vol. 1833, No. 31363. 5 Ibid., vol. 1046, No. 15749.

Protection of the Marine Environment of the North-East Atlantic,[6] the Convention on the Protection of the Marine Environment of the Baltic Sea,[7] the Cartagena Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region[8] and the Lima Convention for the Protection of the Marine Environment and Coastal Area of the South-East Pacific,[9]

Taking note of the final report of the ad hoc Working Group on Dumped Chemical Munitions to the sixteenth meeting of the Helsinki Commission, and noting that the Helsinki Commission, at its ministerial meeting held in Moscow from 18 to 20 May 2010, agreed to establish the Helsinki Commission Expert Group to update and review the existing information on dumped chemical munitions in the Baltic Sea,

Noting that Member States, international and regional organizations and civil society have undertaken activities to discuss the issues related to waste originating from chemical munitions dumped at sea and to promote international cooperation and exchange of experience and practical knowledge,

Noting also the concerns about the potential long-term environmental effects related to waste originating from chemical munitions dumped at sea, including their potential impact on human health,

1. Notes the importance of raising awareness of the environmental effects related to waste originating from chemical munitions dumped at sea;

2. Invites Member States and international and regional organizations to keep under observation the issue of the environmental effects related to waste originating from chemical munitions dumped at sea, to cooperate and voluntarily share relevant information on this issue;

3. Invites the Secretary-General to seek the views of Member States and relevant regional and international organizations on issues related to the environmental effects of waste originating from chemical munitions dumped at sea, as well as on possible modalities for international cooperation to assess and increase awareness on this issue and to circulate such views to the General Assembly at its sixty-eighth session for further consideration.

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[6] Official Journal of the European Communities, L 104.

[7] United Nations, Treaty Series, vol. 2099, No. 36495.

[8] Ibid., vol. 1506, No. 25974.

[9] Ibid., vol. 1648, No. 28325.

The Honorable Andrzej Kraszewski, Minister of Environment, Poland

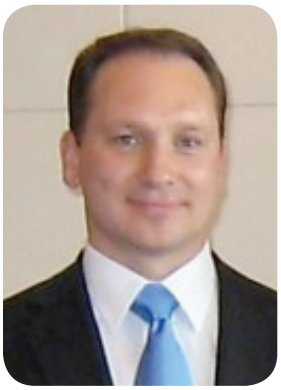
Associate professor at the Department of Environmental Engineering at the Warsaw University of Technology is an expert in environmental impact assessment of the infrastructure ventures.

Professor Kraszewski conducts research projects in the field of the methodologies of environmental impact assessment, environmental impact of transport and the importance of conflict in decision making process. He works also on risk analysis, creation of forecast models, environmental information technology and environmental information systems. Professor Kraszewski was also advisor in the Ministry of Environment, an expert for Parliamentary Commission of Environmental Protection and Natural Resources and vice president of UN EEC Convention on environmental impact assessment in transboundary context. He mediates in conflicts regarding waste disposal facilities and bypass location. He was a moderator during round table conference dealing with Augustów bypass (Rospuda Valley) and Warsaw Round Table on Wastes. He is now the president of National Commission on Environmental Impact Assessment and advisor to the Government Commissioner for Nuclear Energy. Professor Kraszewski in an author of 62 articles, papers, and reports, 3 monographs, 5 implemented studies in industry and public administration. Professor Kraszewski is married with two children.

Keynote Speakers

Ambassador Vaidotas Verba

Ambassador of the Republic of Lithuania Permanent Representative to The Organization For Prohibition of Chemical Weapons (OPCW), The Netherlands.



Ambassador Verba will discuss his country's efforts with the establishment of the International Advisory Board on Dumped Munitions in The Hague and the recent United Nation's Resolution on Chemical Munitions Dumped at Sea, titled: Cooperative measures to assess and increase awareness of environmental effects related to waste originating from Chemical Munitions Dumped at Sea.

Ambassador Verba was born on September 26, 1966, in Raseinai, Republic of Lithuania. Ambassador Verba is married and has one son, Norbertas. Ambassador Verba attended Vilnius University, Faculty of Law, MA. He also attended the University of Birmingham, Graduate School of Political Science and International Studies as well as Lithuanian Physical Education Academy. In 2007, Ambassador Verba was appointed the Ambassador of the the Republic of Lithuania to The Netherlands, Permanent representative to The Organization For Prohibition of Chemical Weapons, in The Hague. During 2004 until 2007, Ambassador Verba held the position of Director, Consular Department, Ministry of Foreign Affairs of The Republic of Lithuania. During 2003 until 2004, Ambassador Verba held the position of the Acting Director, Consular Department, MFA of The Republic of Lithuania. In 2003, Ambassador Verba held the position of the Deputy Director, Consular Department, MFA of The Republic of Lithuania and from 2000 to 2003, Ambassador Verba held the position of the Minister Counsellor, Lithuanian Embassy in Canada. In 1997-2003, Ambassador Verba held the position of Head, Consular Information and Analysis Division, Consular Department, MFA of The Republic of Lithuania. and 1994-1997, Ambassador Verba held the position of First Secretary, Visa Division, Consular Department. From 1990 until 1992, Ambassador Verba held the position of Senior Officer for Foreign Relations, Lithuanian Physical Education and Sport Department un the Government of the Republic of Lithuania. During 1988 until 1990, Ambassador Verba held the position of Scientific Fellow,

Prof. dr Stanislaw Witek

Chairman of International Scientific Advisory Board (ISAB) on Sea-Dumped Chemical Weapons (SDWs)

Full professor of organic technology and chemistry of biologically active compounds at the Department of Chemistry Wroclaw University of Technology, Wroclaw, Poland. Also professor of chemical technology at the Military Institute of Engineering Technique, Wroclaw. Former professor of T. Kosciuszko Military University of Land Forces, Wroclaw (organic technology, chemical weapons 1993 – 2003) Chairman of International Scientific Advisory Board on Sea-Dumped Chemical Weapons. Scientific Advisor of the Ministry of Foreign Affairs Republic of Poland. for chemical and biological weapons

Author of ca. 180 scientific papers published in international journals in the areas of organic synthesis and mechanism of activity of pesticides and other bioactive compounds and ca. 50 patents (also author of two technologies of pesticides production for Polish and East German industries). Author of technology of disposal of Adamsite (applied for utilization of Polish Adamsite deposit in Tarnow, Poland). Author of utilization technology of secondary wastes obtained by alkaline destruction of Lewisite; elaborated within a framework of

Poland – Russian Federation Interstate Agreement and awarded by Prime Minister of Poland as the best technical project in 2005. Author of technology of utilization of rocket fuel oxidizer, applied for utilization of Polish deposit and also in Ukraine. Member of several scientific council in the past: Institute of Industrial Organic Chemistry, Warsaw Poland (1973-2004. also v-chairman for 3 years), Editorial Board of Journal of Environmental Science and Health, Canada (1985-96); Committee of Chemistry of the Polish Academy of Sciences (1973-76), Scientific Advisory Board of the Organization for the Prohibition of Chemical Weapons (OPCW) (1997-2003).

Mr. James C. (J. C.) King

Assistant for Munitions and Chemical Matters, Office of the Deputy Assistant Secretary of the Army, for Environment, Safety and Occupational Health

Mr. J. C. King is a retired career Army officer (Colonel, Retired, Ordnance Corps) with over 37 years experience in all facets of munitions management. J.C. re-entered government service as the Assistant for Munitions and Chemical Matters, Office of the Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health, in March 2007. Prior to that, he served for six years as Special Assistant for Munitions, in the same office, under an Intergovernmental Personnel Act Agreement between the Logistics Management Institute (LMI) and the U.S. Army. He ended a 30 year military career as Division Chief, Munitions Division, G-4, Headquarters, Department of the Army, having, as an Ordnance Officer, over 9 years of command of conventional and nuclear ammunition units and, as an Infantry Officer, command of a Special Forces Operational Detachment.

In his current capacity, he serves as Army Voting Board Member, Department of Defense (DoD) Explosives Safety Board, a position he has held for approximately 13 years, and is the Army lead for a variety of DoD and intergovernmental committees. He performs analysis and develops policy, both Army- and DoD-level, related to munitions-life- cycle management; explosives and chemical safety; unexploded ordnance (UXO); waste military munitions including discarded military munitions; underwater munitions; the conduct of munitions responses (the cleanup of munitions and explosives of concern, to include chemical munitions); support of explosives and munitions emergencies; and sustainable range management. He has been the Army lead for development of policy governing DoD's Military Munitions Response Program, DoD's Implementation of the Environmental Protection Agency's Military Munitions Rule, the Military Munitions Response Prioritization Protocol (32 CFR, Part 179) and its accompanying training program and primer; and DoD and Army policy for the management of Material Potentially Presenting an Explosive Hazard (MPPEH). He has also been responsible for developing both DoD explosives safety criteria governing UXO, the processing and management of MPPEH, munitions responses; and the Army's 3Rs (Recognize, Retreat, Report) Explosives Safety Education Program.

Christopher J. Kennedy

Senior Chemical Demilitarisation Officer, Organisation for the Prohibition of Chemical Weapons (OPCW)

Mr. Kennedy currently has responsibilities for the management of all verification related activities of Old and Abandoned Chemical Weapons as declared within the framework of the Chemical Weapons Convention (CWC). He works closely with Member states to the CWC to resolve verification issues through the identification and implementation of measures that

will increase transparency whilst promoting the safe and efficient destruction of recovered Old and Abandoned Chemical Weapons. Prior to this, as a Chemical Weapons Inspector, Mr. Kennedy has prepared for and conducted inspections as well as lead instruction for new inspectors at the OPCW. Mr. Kennedy has experience in managing the safe recovery and destruction of munitions while adhering to established environmental laws and regulations. He has participated during the design and testing operations of multiple destruction technologies, as well as, developed policy and procedures used to safely recover and destroy Chemical Weapons. His experience includes demilitarisation activities both in the national and international arena.

Keynote Address

Rear Admiral Czesław Dyrcz

In 1973 entered Naval College in Gdynia, at Command Faculty. He graduated from the College as top student. After leaving the College he was assigned to service aboard submarines. He won the title of "the best Navigator in the Navy". In 1981 he was appointed executive officer aboard the ORP Iskra, and from 1984 he was her captain for 13 years. During his service at sea he traveled the distance equal to 10 times of that of the Equator. In 1987 he earned his master's degree in geography at Adam Mickiewicz University in Poznań. In 1997 he finished a post-graduate tactical-operational course for staff and command officers, and then he started service at the Naval Headquarters as chief navigation officer. In 2000 he took over the post of deputy commanding officer for training, 3 Flotilla. From 2002 to 2004 he was head of Hydrographic Bureau of the Polish Navy. Between 2004 and 2005 he attended a postgraduate course of defense politics at National Defense Academy in Warsaw, which he finished as top student. On 15 August 2005 he was promoted to the rank of rear admiral by president of Poland and on 18 August was appointed Commander 9 Coastal Defense Flotilla and stayed there until it was cancelled. On 26 April 2007 he was appointed Rector-Commandant of Polish Naval Academy.

Rear admiral Czesław Dyrcz has sailed round the world and Cape Horn twice. First time aboard the Dar Młodzieży in 1987-88 and then aboard the ORP Iskra in 1995-96. In March this year he was elected mainmast of Cape Horne Fraternity. In April he successfully defended his doctoral thesis under the title "Model of hydrographic service in maritime waters of Poland" at Navigation and Naval Weapons Faculty, Naval Academy.

He is an author of about 100 specialized publications and a co-author of three books. He is a member of Polish Nautical Society, member of National Geographic and Sail Training Association of Poland.

Dialogue Chair

Terrance Long

Founder, Chairman of the Board of Director and Chief Executive Officer (CEO), International Dialogues on Underwater Munitions (IDUM).

Mr. Long's experience and diversity are key elements in the conception and development of the International Dialogues on Underwater Munitions (IDUM) on Sea Dumped Chemical and Conventional Munitions. The main goal of the IDUM is to create Public Awareness and Support for an International Treaty on all Classes of Munitions in a Marine Environment. Mr. Long is a recognized international expert for Munitions Response Programs with more than thirty years' experience and is a retired Canadian Military Engineer who served in Canada, Asia, Africa and Europe specializing in Explosive Ordnance Disposal (EOD) and Demining. He completed ordnance programs at Canadian Forces School of Mechanical Engineering (CFSME); Canadian Forces School of Aerospace and Ordnance Engineering (CFSAOE); NATO Advance EOD program at the British Army School of Ammunition United Kingdom and Northern Ireland; Hazardous Materials Technician at Maritime Environmental Training Institute (METI); Advance Combat Intelligences and the Master's Program in Project Management at Saint Mary's University, Halifax, Nova Scotia. Mr. Long's service has included tours with the United Nations Peacekeeping Forces Middle East (UNEFME); Demining Instructor for the United Nations Offices and Commission on Afghanistan (UNHOCA);

Mr. Long received Appointments as: EOD Chief Canadian Forces Base (CFB) Toronto; United Nations Development Program (UNDP) as a Demining Expert and a member of the International Scientific Advisory Board (ISAB) on Sea Dumped Chemical Weapons (DCW). He appeared before Committees and Commissions to discuss the effects from underwater munitions on human health and the environment. They have included but not limited to: Canadian Senate Standing Committee on Fishery and Oceans; Canada-Nova Scotia Offshore Petroleum Board; Helsinki Commission (HELCOM) for protection of the Baltic Sea, OSPAR Commission for protection and conserving of the North-East Atlantic Ocean, Organization for the Prohibition of Chemical Weapons (OPCW), Chemical Weapons Convention (CWC) and a Key Note Speaker in Germany for Minimizing Risks for the Environment in Marine Ammunition Removal in the Baltic and North Sea (MIREMAR). Mr. Long appeared at the 2nd Committee in November 2010 in New York at the United Nations Second Committee on Sea Dumped Weapons, titled: Cooperative measures to assess and increase awareness of environmental effects related to waste

originating from Chemical Munitions Dumped at Sea to provide an overview of the strategic, economic, environmental, and social aspects of the Resolution on Sea Dumped Chemical Munitions.

Mr. Long is an Associated Partner for the Chemical munitions Search & Assess (CHEMSEA) project for the Baltic Sea Region.

Dialogue Co-Chair

Dr. Andrzej Jagusiewicz

Chief Inspector of Environmental Protection in Poland, Co-Chairman, International Dialogue on Underwater Munitions (IDUM)

A graduate of the Environmental Engineering Department at the Warsaw University of Technology (1964), Post-Graduate Foreign Trade Studies at the Warsaw School of Commerce (1971) and the Summer School of Renewable Energy Sources at the University of PARIS VII (1974). In 1976 he earned a doctoral degree in atmospheric pollution forecasting at the Warsaw University of Technology. He speaks English, French and Russian.

A co-founder of the industry dealing with dust collecting facilities construction in Poland and the Institute of Environmental Protection. He has been, among others, the head of research centres, the director of diplomatic protocol at the Chancellery of the Polish Sejm, the Office Director at the National Labour Inspectorate, the Director of the Department of Monitoring, Assessments and Forecasts at the Chief Inspectorate for Environmental Protection and most recently – the Manager of his own consulting company named "Clean Air for Europe -KlinEr" as well as a member of the management board at the "Ekorozwój" Polish Economic Chamber.

A Polish representative in various negotiating and political bodies in the United Nations and the European Commission, among others, the CAFE Steering Commitee, the Air Quality Committee and the Advisory Council of the programme Global Monitoring for Environment and Security (GMES) or the Executive Body of the UNECE Convention on Long-Range Transboundary Air Pollution (also its Vice-Chair). Moreover, an expert of the United Nations and the European Commission (TAIEX), a member of the Scientific Committee of the French periodical "Pollution Atmospherique" and a university lecturer.

Numerous publications on various aspects of environmental protection in the era of globalization and regionalization, including the European integration in UN publications and foreign, mostly French, periodicals. One of his first books was published in 1981 and it was entitled "Powietrze, Człowiek, Środowisko" (Air, Man, Environment). The most recent publications include: the preparation of a special edition of the scientific periodical POLLUTION ATMOSPHERIQUE (December 2002) devoted to air protection strategies and policies in the countries undergoing economic transformations, co-participation in an overview published by the United Nations and devoted to the review of environmental protection policy of Serbia and Montenegro (June 2003).

A key note speaker at the Second International Dialogue on Underwater Munitions, member of the Scientific Advisory Board on Sea-Dumped Chemical Weapons, coordinator of the Flagship Project "Assess the need to clean up contaminated wrecks and chemical weapons" under the European Union Strategy for Baltic Sea Region and initiator of the HELCOM MUNI group. Since 2011 Mr. Andrzej Jagusiewicz also holds a function of Marine Director appointed under the EU Marine Strategy Framework Directive, and is Vice-Chairman of the National Environmental Council."

On **Wednesday, April 13, 2011**

TIME	ACTIVITY
6:00 PM to 8:00 PM	Registration & Evening Reception, Informal, Sheraton Hotel & SPA (Dress Casual - No Jeans)

DAY 1: **Thursday, April 14, 2011**

TIME	ACTIVITY
7:00 AM to 8:00 AM	Breakfast & Networking Exhibition Hall (Dress Business Casual)
8:00 AM to 8:30 AM	OPENING CEREMONIES Moderator: Dr. Thomas Stock, International Scientific Advisory Board (ISAB) *Welcoming Remarks* Dr. Andrzej Jagusiewicz Host Organization. , Co-Chairman IDUM *Opening Remarks* Mr. Terrance P. Long CPSM. SSM. CD, Chairman IDUM *Keynote Address* Rector Commander of the Polish Naval Academy, Counter Admiral Czeslaw Dyrcz Ph. D.
8:30 AM to 10:00 AM	SESSION 1 CHAIR: Mark Eggers, President, LASEOD Group Ltd *How to maximize the efficiency and focus the national and multinational Mine Clearance activities to the areas most needed* Gunnar Möller, Lieutenant Commander, COM Mine Warfare Data Center (C MWDC), 4th Naval Warfare Flotilla *Problems in Locating Historic Dumping Sites* Mr. Uwe Wichert, State Office for Civil Protection and Disaster Control, Kiel, Germany *Overview of US Efforts Relating to Legacy Underwater Munitions* Mr. Geoffrey Carton, CALIBRE Systems, Inc.
10:00 AM to 10:30 AM	Break & Networking Exhibition Hall
10:30 AM to 12:15 PM	SESSION 2 CHAIR: John Hart, ISAB *The Ordnance Reef (HI-06) Study of Disposed Military Munitions, Oahu, Hawaii: An Example of a Collaborative Approach to a Scientifically Rigorous Investigation* Eric Heinen De Carlo, Sonia Garcia, Didier Dumas, J. C. King and Geoffrey L. Carton *Case Study in Underwater Investigations and Removals of Legacy Munitions in Environmentally and Culturally Sensitive Locations* Ms. Carol Charette, USACE New England District, Mr. Michael F. Warminsky PE, Vice President, UXB International, Inc. Flemington, New Jersey *Formerly Used Defense Sites At Martha's Vineyard, Massachusetts And Kanahena Point, Maui, Hawaii, USA, Underwater Removals and Investigations* Ms. Kim Meacham, P.E., U. S. Army Engineering and Support Center

ALL SESSIONS WILL BE HELD IN COLUMBUS A AND B.

TIME	ACTIVITY
	Formerly Used Defense Sites at the Island of Culebra, Puerto Rico Underwater Investigation and challenges encountered Mathew Gapinski, SAJ, Chief, Interagency & International Services branch, Chief, Interagency & International, Services Branch, Jacksonville District, U.S. Army Corps of Engineers U. S. Army Engineering and Support Center, Huntsville, Alabama, USA *Screening of Sediments for Munitions: An Overview of the US Navy's Recent Pilot Study in Ostrich Bay, Washington* Scot Wilson, Mark Murphy, Robert Feldpausch
12:15 PM to 1:30 PM	LUNCH Moderator: Mike Warminsky, Vice President, UXB International Inc. KEYNOTE SPEAKERS Ambassador Vaidotas Verba, Permanent Representative of Lithuania to The Organization for the Prohibition of Chemical Weapons (OPCW) Mr. Christopher Kennedy, Senior Chemical Demilitarization Officer, Organization for the Prohibition of Chemical Weapons (OPCW)
1:30 PM to 3:00 PM	SESSION 3 CHAIR: Ambassador Vaidotas Verba *Dispersion of passive tracers in the Baltic Sea Deep Water* Professor Victor Zhurbas and Professor Vadim Paka, Shirshov Institute of Oceanology of Russian Academy of Sciences *Chemical Munitions Search & Assess (CHEMSEA) Project – Towards creating risk assessment tools for the Baltic* Professor Jacek Bełdowski, Institute of Oceanology PAS *Outline of Environmental Genotoxicity Risk in CW Dumping Zones* Professor Janina Baršiene, Institute of Ecology of Vilnius University, Vilnius, Lithuania *Methodology of estimate danger of consequences influenced by Dumped Chemical Weapons in the environment* Professor Alexander Gorbovskiy, Russian Federation
3:00 PM to 3:30 PM	Break & Networking Exhibition Hall
3:30 PM to 5:30 PM	SESSION 4 CHAIR: Finn Longinotto, Global Green *Environmental Risks of UXO/MEC Contaminants in Sediment Addressed by Laboratory Toxicity Testing* Dr. Jon Doi, Ph.D., Aqua Survey, Inc., Flemington, NJ, USA *Functionality of Landmines Influenced by Salt Water* Mr. Martin Jebens, Geologist, M.Sc., GIS-Manager Mine clearance Skallingen, The Danish Coastal Authority *Advancing Underwater UXO Site Prioritization Using Threat Factor Analysis* Mr. James Barton, President, Underwater Ordnance Recovery Inc.

AGENDA

TIME	ACTIVITY
	Destruction of Old Chemical Weapons – Technologies under application Dr. Thomas Stock, DYNASAFE Germany GmbH, Düsseldorfer Germany *How safe is safe enough for Chemical Weapons Destruction System-as Analogy of a Nuclear Facility* Dr. Joseph Kiyoshi Asahina, Chief of Technology, Nuclear and CWD division, Natural Resources & Engineering Business Kobe Steel, LTD
6:00 PM to 7:00 PM	TBA

DAY 2: **Friday, April 15, 2011**

TIME	ACTIVITY
7:00 AM to 8:00 AM	Breakfast & Networking Exhibition Hall (Dress Business Casual)
8:00 AM to 10:00 AM	SESSION 5 CHAIR: Mr. Mike Warminsky, Vice President, UXB International Inc. *Deep Underwater UXO Clearance* Mr. Arthur Hollmann, The Netherlands *Underwater Munitions Location, Mapping, Analysis and Removal* Mr. Tom Rancich, CEO VRHabilis LLC *Adapting Remote Operated Non-Destructive Underwater UXO Remediation Technology for Casualty Response Associated with Offshore Natural Resource Development,* James Barton, President, Underwater Ordnance Recovery Inc. *Investigation of Chemical Munitions Dumpsite in the Bornholm Basin using Geophysical and Chemical Methods* Dr. Martin Söderström and Paula Vanninen VERIFIN, Finnish Institute for Verification of the Chemical Weapons Convention, University of Helsinki and Tine Missiaen, Renard Centre of Marine Geology, Department of Soil Science, University of Gent, Belgium
10:00 AM to 10:30 AM	Break & Networking Exhibition Hall
10:30 AM to 12:00 PM	SESSION 6 CHAIR: Dr. Joseph Kiyoshi Asahina, KOBE *Considerations on Magnetometer Systems for Underwater UXO Detection* Dr.-Ing. Kay Winkelmann, SENSYS, Sensorik & Systemtechnologie GmbH *Summary of Recent Underwater Munitions Surveys Associated Mythologies* Mr. Richard Funk *Demonstration Project, Remotely Operated Underwater Munitions Recovery System (ROUMRS)* Mr. John Coughlin, ARA Inc. *A Hybrid AUV/ROV offshore system, Seaeye Sabertooth* Mr. Chris Roper, Roper Resources, Bert Johansson, Saab Underwater Systems AB, Jan Siesjö, Saab Underwater Systems AB

ALL SESSIONS WILL BE HELD IN COLUMBUS A AND B.

TIME	ACTIVITY
12:00 PM to 1:15 PM	LUNCH Moderator: Mr. Mark Eggers, President, LASEOD Group KEYNOTE SPEAKERS Mr. James C. King, Assistant for Munitions and Chemical Matters, Office of the Deputy Assistant Secretary of the Army, for Environment, Safety and Occupational Health TECHNOLOGY DEMONSTRATION *Water Jet Technology for the Safe Cutting of Munitions and Fuze Removal,* Mr. Manfred Hagenbrink, ANT, Germany (outdoors)
1:15 PM to 3:15 PM	SESSION 7 CHAIR: Ken Hayes, President, Aqua Survey Inc. *Clearing 49 munitions from Gulf of Finland for Nord Stream AG pipelines: impact assessment and monitoring results* Ms. Tiina Salonen and Mr. Simon Bonnell, Nord Stream AG, Romke Bijker, Witteveen+Bos Consulting Engineers *The Burgas Dredging Project. Multidisciplinary thinking as an incentive towards Pragmatic Solutions in a Maritime Environment* Bart Van der Speeten, aDeDe *Advanced Integrated Marine Characterization Technologies for Munitions Applications* Dr. Jack Foley, Sky Research, Inc. Co-contributors: Jerry Hodgson (USACE-Omaha), John Steinbergs (SKY), Raul Fonda (SKY), Greg Schultz (SKY), Mark Eggers (LASEOD) *Impact of Underwater Detonations on Marine Vertebrates* Mr. Sven Koschinski, Marine Zoologist, Nehmten / Germany *Risk Mitigation for Deep Water Exploration in Ammunition, Explosives, Chemical and Radiological Dump Site off the East Coast of Canada,* Mr. Terrance P. Long, Chairman, IDUM *The Potential Effects of SEMIC Exploration on Sea Dumped Chemical and Conventional Munitions,* Mr. Terrance P. Long, Chairman, IDUM
3:15 PM to 3:45 PM	Break & Networking Exhibition Hall
3:45 PM to 4:15 PM	OPEN PANEL DISCUSSION (Panel TBA)
4:15 pm to 5:00 pm	CLOSING RECEPTION & CEREMONIES Moderator: ISAB *Closing Keynote Address* Dr. Andrzej Jagusiewicz Host Organization. , Co-Chairman IDUM Mr. Terrance P. Long CPSM. SSM. CD, Chairman IDUM

AGENDA

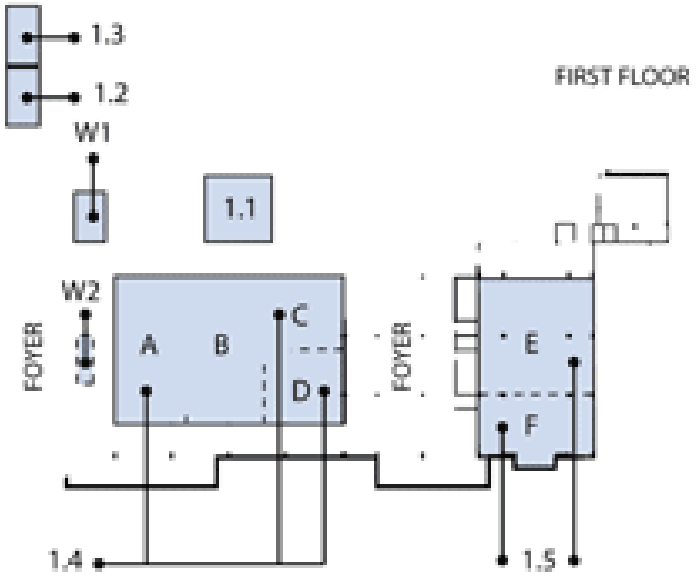
Poster Presentations

Poster presentations will be available for viewing in Grand Foyer A during the Dialogue.

Exhibitors

Exhibitor booths will be available for viewing in Grand Foyer A during the Dialogue.

BOOTH	COMPANY
1	UXB INTERNATIONAL Inc.
2	UXB INTERNATIONAL Inc.
3	LASEOD GROUP Ltd.
4	LASEOD GROUP Ltd.
5	ROPER RESOURCES Ltd.
6	SENSYS
7	AQUA SURVEY, Inc.
8	VR HABILIS
9	KOBELCO KOBE STEEL GROUP
10	aDeDe



Third International Dialogue on Underwater Munitions

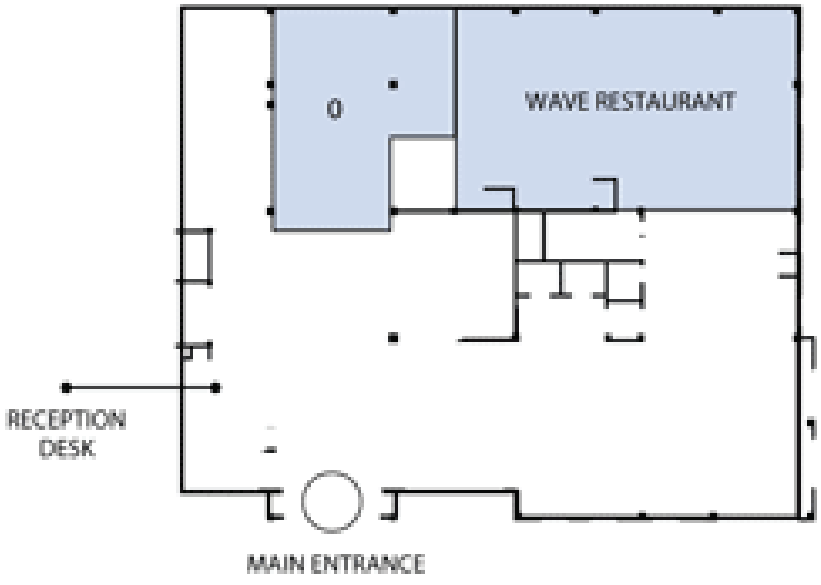
April
13-15
2011

Sheraton Hotel
Conference Center
& Spa

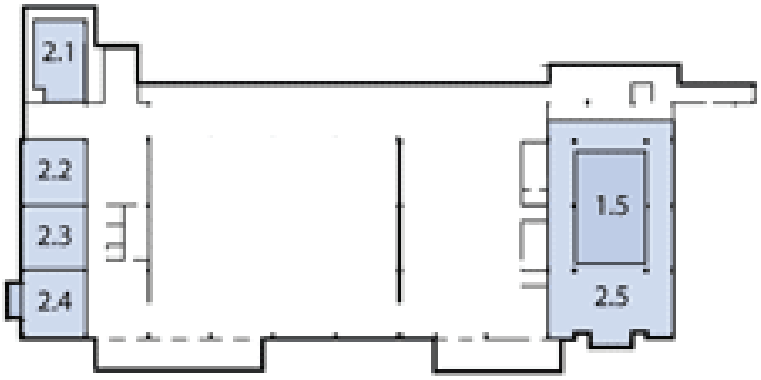
FLOOR PLAN

Room 0:	David Livingstone	Room 2.1:	Henry Hudson
Room 1.1:	Vasco da Gama	Room 2.2:	James Cook
Room 1.2:	Willem Barents	Room 2.3:	Amerigo Vespucci
Room 1.3:	Roald Amundsen	Room 2.4:	Ferdinand Magellan
Room 1.4:	Columbus (Audiohall)	Room 2.5:	Marco Polo Balcony
Room 1.5:	Marco Polo (Ballroom)		
W1:	cargo winch		
W2:	elevators		

GROUND FLOOR



SECOND FLOOR



How to maximize the efficiency and focus the national and multinational Mine Clearance activities to the areas most needed

Gunnar Möller

The presentation has the purpose to give the audience information about:

- o A general overlook of the situation of UXO in the Baltic Sea
  - The minefields and the density of remaining mines
  - The ammunition dumping areas
  - The firing- and exercise areas
  - The areas of battle 1914-1945
- o The multinational Mine Clearance activities carried out 1995-2008
  - The Intelligence picture and the general purpose of the activities
  - The OPEN SPIRIT- and MCOP-operations
  - The Swedish Navy research project
  - The minefield database
  - How to define a Mine Danger Area concerning Historic Ordnance
  - The result of the Swedish Defence Research Agency risk analyze of sunken World War mines
- o The Swedish Navy national Mine Clearance operations named "Långan" 2004-2006 – the development of Historic Ordnance Surgical Operations
- o The creation of the "Baltic Ordnance Safety Board" (BOSB)
  - The purpose of the Board
  - The BOSB products
- o How to prioritize areas most needed to be cleared
  - The BOSB operation area prioritization system
- o The conducted and BOSB supported Mine Clearance operations 2008-2010
- o The BOSB supported Mine Clearance operations in the Baltic Sea 2011

Problems in Locating Historic Dumping Sites

Uwe Wichert, State Office for Civil Protection and Disaster Control, Kiel/ Germany

An unknown number of ammunitions have been dumped in the Baltic Sea. We know only the number of laid mines and I will show the problems along this fact.

The quality of Logbooks, wardiary, reports or orders show us a different level, same as the older navigations systems or procedure. If we look on the wartime influence and the possibility of moving by minesweeping or fishing action, we must commit that we only have a overlook about the position of ammunition.

With new, modern systems as Sonar, GPS and Radar, electronic Seacharts, and the problems between old and modern Systems, we works on a solution for real correct positions about the ammunition and last but not least an identification of every ammunition part.

Overview of US Efforts Relating to Legacy Underwater Munitions

Geoffrey Carton, CALIBRE Systems, Inc

The U.S. Department of Defense (DoD) sea-disposed from at least the early 1900s through 1970. The U.S. Armed Forces established procedures for sea disposal of military materials as early as 1917. When chemical warfare materials (CWM) were added to the U.S. military arsenal, these procedures, which became more stringent over time, were revised to address specifically sea disposal of CWM.

Use of the oceans is expanding and the best way to minimize unintentional encounters with munitions is to assemble available documentation to provide decision makers situational awareness when evaluating new projects or changes in use. Several recent incidents reveal the importance of this historical information.

The goals of the US Army in relation to legacy underwater munitions are to:

- Understand the impact of sea disposed munitions on the marine environment and those that use it; and of the marine environment on sea-disposed munitions.
- Determine potential risk associated with sea-disposal sites in US coastal waters so that unacceptable risks to human health and the environment can be addressed

In 2006, the U.S Congress enacted legislation (Public Law 109-364, Section 314) requiring Research on Ocean Disposal. The legislation requires identification of disposal sites in US coastal waters, identification of navigational and safety hazards, and a variety of research.

Historical research to inventory and report legacy sea disposal sites is complete and the final report to Congress was published in 2010. An overview of the disposals in US coastal waters and the characteristics of the sites is provided. The Army is currently working with the National Oceanic and Atmospheric Administration update the nautical charts based on the archive research. Last, research is ongoing at several sites and a technology demonstration for the recovery and demilitarization of legacy underwater munitions is planned. The Army continues its robust Explosives Safety Education Program.

The Ordnance Reef (HI-06) Study of Disposed Military Munitions, Oahu, Hawaii: An Example of a Collaborative Approach to a Scientifically Rigorous Investigation.

Eric Heinen De Carlo, Sonia Garcia, Didier Dumas, J. C. King and Geoffrey L. Carton

In 2006, the National Oceanic and Atmospheric Administration (NOAA) and the University of Hawaii (UH), under agreement with the Army, conducted a survey of DoD Sea-Disposal Site HI-06, locally known as Ordnance Reef. After World War II, DoD sea disposed munitions at this near-shore, coral-reef ecosystem. This study provided the Army a screening-level assessment of HI-06. The assessment suggested that the

underwater military munitions (UWMM) present and munitions constituents (MC) from these UWMM did not posed an unacceptable risk to human health and the environment. DoD's review and reviews by community members, and State and other federal agencies identified data gaps related to potential human-health impact from the consumption of marine life. To address this gap, the Army established the Ordnance Reef Coordinating Council (ORCC) composed of representatives from the Army, state and federal agencies, and elected representatives and members of the affected communities. The ORCC identified the study question—Are the fish safe to eat?—and courses of action for the Army's consideration. To close the data gaps, UH, with Environet Inc., a private firm, conducted a comprehensive remedial investigation (RI) and risk assessment at HI-06 to provide the Army and ORCC scientifically defensible data with which to answer the study question. With Army oversight, the RI was conducted in close coordination with other related efforts by the Army and NOAA.

This presentation will highlight the Army's transparent and collaborative approach to address an emotional and contentious issue--the presence of UWMM in an area used by the native population, which is highly dependent on the availability of healthy marine resources. It will also briefly present the scientific approach, summarize major findings to date, and describe other activities at the site.

A Case Study in Underwater Investigations and Removals of Legacy Munitions in Environmentally and Culturally Sensitive Locations

Carol Charette and Michael F. Warminsky

Military training for past World Wars has resulted in legacy munitions in the most "unexpected" locations. In the case of Martha's Vineyard, a bucolic vacation destination visited by 10,000-15,000 tourists per day during the peak vacation season, as well as home to several Native American peoples and numerous threatened and endangered wildlife and plant species.

On Martha's Vineyard, Cape Poge was home to a bombing target by the Department of the Navy; the former Moving Target Machine Gun Range at South Beach was used as a gunnery target for aerial machine gun and rocket firing practice, and Tisbury Great Pond, President Barack Obama's vacation destination the past two years, served as a dive bombing and strafing range in support of the fighter training program of Quonset Point Naval Air Station, the Naval Auxiliary Air Station Martha's Vineyard, and the carrier fleet based at Newport, Rhode Island. This training resulted in the deposition of munitions ranging from small arms, air-to-ground rockets, and up to 100 pound practice bombs. While this training took place in preparation for the D-Day invasion, the munitions still exist, and despite the public removing them as "harmless souvenirs", they still have the potential to function, thus necessitating an investigation and removal action.

The impacted areas include the near-shore surf zone, inland tidal ponds, fresh water ponds, beaches/dunes and upland tracts. Each area presents unique challenges – the extremely dynamic ocean surf zone, commercial shell fishing interests in the tidal ponds, access to the inland fresh water ponds, and numerous land-owners for the beach and upland areas. The focus of this presentation is lessons learned from using a multi-sensor "layered" approach to geophysics, and corresponding technical approach for intrusive investigation/removal developed for each area to meet project objectives while minimizing impacts to the environment and vacationing public.

Formerly Used Defense Sites At Martha's Vineyard, Massachusetts and Kanahena Point, Maui, Hawaii, USA, Underwater Removals and Investigations

Kim Meacham, U. S. Army Engineering and Support Center

The Cape Poge Little Neck Bomb Target Site was used as a bombing target by the Department of the Navy. Munitions items found to date are the three-pound practice bomb, and the AN-MK 23, with a spotting charge. The public has been observed digging for clams using their bare hands and/or hand tools such as pitchforks within the mudflats of the former bombing target site. The public has been known to remove the practice bombs from the site and take them home as souvenirs.

The Moving Target Machine Gun Range at South Beach was used as a gunnery target for aerial machine gun and rocket firing practice. The Former Moving Target Machine Gun Range was built on the existing beach in the late 1940's. Due to the erosion of the beach the site is now approximately 200 to 400 feet of shoreRocket motors with the warhead sheared off have been encountered in the water at South Beach and Norton Point with increasing frequency. South Beach is a public beach visited by 10,000-15,000 tourists per day during the peak summer season.

Per the Edgartown Beach Patrol, when the public finds items in the water, they bring them up out of the water onto the beach.

The Fourteenth Naval District reportedly conducted practice bombing exercises on the site using miniature and practice bombs. A visual survey conducted in 1996 identified a six-inch naval projectile, a mechanical time fuze, a .50 caliber projectile and impact craters which indicated the use of high explosive (HE) munitions at the site. An investigation is on-going to determine the nature and extent of contamination.

Underwater removal and investigation techniques, methodologies, and equipment and innovative technologies used will be presented for the three Martha's Vineyard sites and Kanahena Point.

Formerly Used Defense Sites at the Island of Culebra, Puerto Rico Underwater Investigation and challenges encountered

Mathew Gapinski

Culebra Island and the surrounding cays consist of approximately 8,430 acres that were heavily used for aerial bombing, maneuvers, artillery firing and amphibious training by the US Navy and the Marines from 1902 to 1975.

Currently, Culebra has a combination of residential, commercial, and recreational areas, centralized around the town of Dewey on the west central portion of the island; The surrounding cays are managed by the U.S. Fish and Wildlife Service (USFWS), the Puerto Rico Environmental Quality Board (PREQB), and the Department of Natural and Environmental Resources (DNER).

Culebra and the surrounding cays have irregular and rugged coastlines with sandy beaches lagoons, wetlands and mountainous terrain. The vegetation is moderate to extremely dense. There are 75 federally listed threatened and endangered species consisting of 26 animals and 49 plants and 13 state listed species. There is the potential for cultural or historical resources to be on the site.

Munitions used for training on the site include high explosive bombs, projectiles, illumination, practice rounds and rockets as well as 155 mm, 105 mm, 75 mm, 81 mm, 40 mm, 20 mm and small arms. Munitions remain in the surrounding water at the site.

The presentation will focus on the underwater techniques and removal methodologies that will be used at Culebra and the adjacent cays. It will discuss equipment, innovative technologies, and challenges that we have faced during characterization at this site.

Screening of Sediments for Munitions: An Overview of the US Navy's Recent Pilot Study in Ostrich Bay, Washington

Scot Wilson, Mark Murphy, Robert Feldpausch

The Navy conducted a pilot study in the fall of 2009 to investigate munitions removal methods, sediment screening methods, and post-process verification techniques at Ostrich Bay Washington. This study is part of the Remedial Investigation/Feasibility Study (RI/FS) being implemented to determine the nature and extent of potential discarded military munitions with high explosives (DMM) in Operable Unit 3—Marine (OU 3M) and to evaluate remedial alternatives appropriate to address potential explosive hazards presented by these DMM items. The RI/FS is being performed under criteria established by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

OU 3M encompasses elements of the non-Navy-owned intertidal and all subtidal areas of Ostrich Bay, which borders the U.S. Department of the Navy's Jackson Park Housing Complex and Naval Hospital Bremerton in Bremerton, Washington. The project area is located on the former Naval Ammunition Depot (NAD) Puget Sound. Nearly all munitions stored, manufactured, demilitarized, or otherwise handled at NAD Puget Sound were brought to and shipped from the site via marine transport and were handled on one of three piers established at the site. The existing Pier 2 and former Pier 1 subtidal areas are the only areas of Ostrich Bay with historic detection and recovery of munitions. The Navy intends to perform a remedial action surrounding the piers to remove any remaining munitions that may be present. This Pilot Study will assist in determining the technology to be utilized to screen the sediments for munitions, safely remove them, and verify the removal process.

Our poster will provide an overview of the methods included in the pilot study and the preliminary findings/conclusions from the pilot study.

Dispersion of passive tracers in the Baltic Sea deep water

Victor Zhurbas and Vadim Paka

To forecast possible scenarios of propagation and dispersion of toxic compounds from dump sites of chemical munitions in the Baltic Sea, next steps were made. Firstly, a hydrodynamic model capable to calculate velocities of currents and diffusivities in the Baltic Sea deepwater as well as bottom stress has to be developed. The bottom stress is required to parameterize vertical fluxes of matter through interface between bottom sediments and near-bottom water (i.e., re-suspension). The circulation model is based on the Princeton Ocean Model, in which the vertical grid size is logarithmically refined towards the bottom in order to resolve the bottom boundary layer (BBL). Secondly, a diffusion model should be worked out to calculate matter transport in the bottom sediments-water body system. Input parameters for the diffusion model are 4D fields of current velocities and diffusivities along with bottom fluxes of a matter and settling velocity of suspended particles. Before analyzing results of the simulation experiments we have to make sure that (a) the hydrodynamic model does resolve the BBL of enhanced turbulent diffusivity and (b) the random walk model does not display unrealistic removal of particles from the BBL and further accumulation in above-laying layers due to inhomogeneity of the diffusivity. Vertical profiles of vertical turbulent diffusivity in the Slupsk Sill and in the Bornlolm Deep were simulated by the hydrodynamic model at some chosen

wind conditions. Test experiments were implemented to study the ability of the random walk model to describe adequately vertical transport of particles in the Baltic Sea BBL.

Results of numerical experiments performed for the tracer released in the Bornholm Strait BBL by use of both the finite difference and the stochastic diffusion models were similar to each other. Simulated patterns of the matter concentration and pathways of particles characterized by the settling velocity ws = 2 m/day show a forking of the matter pathway in the Bornholm Basin: the matter passes either around the north of the Bornholm Basin clockwise, or moves counterclockwise in the southern periphery of the Basin. The wind direction is a factor that shapes the transport pathway of the suspended particles as they enter the eastern Baltic Sea from the Slupsk Furrow: the particles go round to the north towards the Gotland Deep under the northerly wind but they turn to the south towards the Gulf of Gdansk under the easterly wind. Unlike the case of the suspended particles arrival into the Bornholm Basin, there is no forking of the pathway of the particle transport into the north and south branches when the suspended particles enter the Eastern Gotland Basin from the Slupsk Furrow. This approach is expected to forecast plausibly the shape of spatial distribution of CWA, while the absolute values of the simulated concentration may be far from reality because e.g. the exposure period (60 yr) and therefore the input rate of CWA were taken quite arbitrary. Having VERIFIN's measured data for some sites we can introduce a scaling factor to fit the simulated concentrations to the measured ones and therefore extrapolate the measured concentrations to the whole domain. However, it seems worthwhile to discuss discrepancies between measured and simulated concentrations. Almost all samples taken within the MERCW project and analyzed by VERIFIN refer to upper sediments, while modeling results dealing with concentrations of dissolved agents in the sea, hence straightforward comparison is hardly justified.

Chemical Munitions Search & Assess (CHEMSEA) Project: Towards creating risk assessment tools for the Baltic

Jacek Bełdowski

Over 50000 tonnes of CWA were sunk in the Baltic, with official dumpsites in the Bornholm Deep, Gotland Deep, Little Belt and Skagerrak. Basing on literature sources and occasional shoring /by catches of CWA, the munitions seems to be spread in many other places on the seafloor. In 1995 final report of HELCOM stated that sunk chemical munitions represent minor threat to the environment when undisturbed. However, several other reports published later showed that ecological threat for the Baltic Sea is real, in situation when the munitions are hit by sea-bottom installation and activities such as trawler fishing or cable works.

Baltic Sea bottom activities are increasing due to technology progress and growing pressure on marine resources. In some cases, large scale hydrotechnical activities are situated close to contaminated sediments.

So it is necessary to increase safety of underwater activities, by defining special areas, where submarine activities should be restricted, or carried out with special care.

CHEMSEA Project is currently submitted to 4th Call of the Baltic Sea Regional programme. It incorporates surveying, ROV objects examination, ecological risk assessment, chemical analyses and modelling. It includes 12 Institutions from Finland, Germany, Lithuania, Poland and Sweden – both academic and marine administrations.

The project also aims to provide maps of sea bottom areas contaminated with CWA or CWA degradation products, and tools to assess environmental risk associated with eventual leakage of sunk chemical munitions, as well as guidelines and procedures developed for such sites.

In the presentation the relevance of the planned activities to the present knowledge concerning sunk chemical munitions in the Baltic, interlinking of activities in the project and probable outcome will be discussed.

Outline of environmental genotoxicity risk in CW dumping zones

Janina Baršiene, Institute of Ecology of Vilnius University

Over the last decades human activities create continuous release of hazardous substances to the marine ecosystems and have increased interest in evaluating the biological effects associated with polluted habitats of organisms. Mixtures of toxic compounds can alter molecular, cellular, physiological and other processes and biological consequences of exposure can be traced in functional impairment, aging, tumor development. There is a growing concern over the presence of many compounds that induce genotoxic effects with or without directly damaging DNA. The cytogenetic techniques used

in this study proved to be a reliable tool for the laboratory assessment of genetic alterations induced by heavy metals, PAHs, crude oil, flame retardants and other hazardous agents and for the evaluation of environmental genotoxicity of contaminant mixtures in situ.

Our studies represent the first wide-scale attempt to assess the environmental genotoxicity in different fish and mussel species from 85 sites in the North Sea and Atlantic Ocean and from 117 sites in the Baltic coastal and offshore zones. The study demonstrated the distribution of genotoxins in the areas influenced by contamination from the largest rivers, extensive maritime routes, marine ports, oil terminals and platform, industrial and municipal effluents. Genotoxicity levels in CW dumping areas were studied in the Baltic Sea in 2001-2004 and in 2009-2010, in the North Sea – in 2001, 2002 and 2009. Significant increase of the responses was observed in the Bornholm and the Little Belt zones in 2009 and 2010, compared to 2001-2004. In fish from the Polish and Danish EZ, the increase of micronuclei and nuclear buds in 2010 exceeded 7-15 times the reference level. In the Little Belt site close to CW dumping, the levels of genotoxicity in 2010 were 9-10 times higher, than in 2001-2004. 5-13-fold elevation of micronuclei was found in the Goteborg zone in 2009, compared to 2001 and 2002. Increased growth of chemical warfare degrading microorganisms in these CW dumping zones suggests distribution of the munition agents (Medvedeva et al., 2009). CW agents represent the high hazards for aquatic organisms. For fish communities: Triphenyl arsine>Adamsite>Clark1>Yperite. The risk to human appears via consumption of CWA-contaminated fish (Sanderson et al., 2008). The Bornholm zone is the richest fishery area in the Baltic. The ecological significance of genetic damage, which is characterized as long-term irreversible process, will be discussed in relation to formation of genetic risk zones and appearance of risk for wildlife population's existence. Special point of discussion will be done on potential to violate genetic diversity of unique Baltic populations.

Methodology of estimate danger of consequences influence dumped chemical weapons on environment

Professor Alexander Gorbovskiy

In present time huge quantity of dumped chemical weapons is still on bottom of seas and oceans in different regions of the world. 25-60 years and even more passed since its flooding. Corpses of chemical munitions incurred corrosion and broke gradually in sea water during long time. Released chemical agents entered into chemical reactions with sea water and generated a broad list of substances with various toxicity.

Last time exploitation of underwater nature resources including out-turn of minerals, fishery increased as well as widening of littoral zones for tourism. Surely, this activity in areas of dumped chemical weapons is connected with risks for environment and people. It's extremely necessary to undertake practical actions, which could exclude its dangerous influence on health of people.

Authentic reliable estimate of the dumped chemical weapons consequences danger, which could take into account all essential factors on environment, is required to make effective decisions. Comprehensive methodology to resolve this problem has not been created till present time.

Chemical weapons suffered a lot of different quality transformations during long location on the bottom of the sea it. Several main phases of these changes can be distinguished:

First phase. Contamination of the sea is absent until corps of munitions are not destructed by corrosion. Prognosis time of dissection of munitions for thin corps (barrels, containers) is up to 50 years and for artillery shells – up to 200 years.

Second phase. Destruction of munitions started, cracks and holes appeared in corps of containers, bombs and shells. Chemical agents flew out through holes into the sea water. Speed of diffusion defines time of their outflow. Calculations show that time of full evacuation of the toxic chemicals depends on volume of munitions and can be from 10 to 25 years.

In present time theoretical and experimental methods exist for predicting of time of the munitions corpses destruction and full evacuation of the toxic chemicals from the munitions.

Third phase. Hydrolysis of chemical agents in the sea water. Different chemicals are formed as a result of consequent chemical reactions of the chemical agents with water. These processes have been enough investigated in the laboratories. Comprehensive list of ending products of hydrolysis exists, as well as nowadays analytic methods and equipment for determination of contents of the chemical agents decomposition products in sea water and bottom silk.

Fourth phase. Processes of digestion of the chemical agents decomposition products by marine organisms (algae, plankton), then transition of these toxic chemicals into sea foodstuff for people. It's necessary to know information about danger of all chemical agents decomposition products for people. Also reliable estimate of danger of chemicals value in fish and other sea foodstuff for people is required. After that we could estimate consequences of the dumped chemical weapons influence on health of population, including distant consequences concerning cancerous properties and genetic deviations.

Results of these researches should be approval of the maximum permissible values of chemical agents decomposition toxic products in bottom layer of sea water, marine organisms and sea foodstuff. Also development of specific methods and devises for practical determination of these toxic substances value in all sea foodstuff is required.

Additional researches are required for development of methodology to estimate danger of the consequences of the dumped chemical weapons influence on health of population. These works could be fulfilled under international cooperation by Scientific Research Institutes of concerned States.

Proposals for actual projects, which Russian Scientific Research Institutes could fulfill jointly with Institutes of other countries, will be presented in this report too.

Environmental Risks of UXO/MEC Contaminants in Sediment Addressed by Laboratory Toxicity Testing

Jon Doi, Ph.D., Aqua Survey, Inc.

The primary focus of the detection and removal of underwater munitions has been for the acute effects on humans, i.e., bombs exploding. However, the greater concern may be on the environmental effects of bomb constituents (propellants and explosives) leaking from bombs for considerable lengths of time. This talk will cover a number of topics on the surveying, sampling and laboratory toxicity testing of UXO/MEC in sediments. There will be a brief discussion on the use of various EM survey devices for UXO/MEC detection and on the sampling techniques used for UXO/MEC-contaminated sediments. The main part of the talk will be on how our laboratory deals with these types of sediments in the laboratory and what tests are useful. Before the sediment is opened for homogenizing and compositing, it is scanned for possible UXO/MECs. The choice of the type of toxicity test to perform (acute, chronic, freshwater, marine or bioaccumulation), the organism chosen, the conditions of the toxicity test are all important decisions to be made in order to determine whether the sediment is likely to have an impact on the benthic community at the UXO/MEC-contaminated site. The identification of bomb constituents and possible toxicity associated with these contaminants will be discussed.

Functionality of landmines influenced by salt water

Martin Jebens, Geologist, M.Sc.

The Danish Coastal Authorities is currently conducting a landmine clearance operation on the West Coast of Denmark. The landmines have been laying in wetland terrain and coastal areas since WWII. During the mine clearance operation the Danish Coastal Authorities have made continuous chemical analysis (X-ray diffraction and electronic microprobe) and physical analysis (functionality test and impact sensitivity test) of explosives as well as the condition of fuze mechanics and landmine casing. The result of this work has shown that mines found in the wetland area has changed and have lost their functionality. This is mainly due to the impact from salt water which after more than 60 years has entered the vital parts of the landmines. This process has altered the primary explosives in the detonators and has corroded the fuzes preventing them from moving freely. The traditional assumption is that aging ammunition tends to become unpredictable, which is often interpreted as unstable. In contrast, this study, as well as a study made by the Mine Action Information Center at James Madison University, has shown that landmines buried for a long time can change and become inactive. A chemical and physical analysis of underwater munitions would reveal the functionality. The consequence of this could result in low-risk clearance operations herby preventing an expensive high-risk operation. Therefore, it is interesting to look at the deactivation of ammunition by passive decomposition.

Advancing Underwater UXO Site Prioritization Using Threat Factor Analysis

James Barton, President, Underwater Ordnance Recovery Inc

This presentation advances underwater UXO site prioritization by defining the four most common threat factors affecting such sites. These include the possibility of an energetic event; physical damage to existing or proposed subsurface infrastructure; the toxicological impact; and influence on economic development. Careful analysis of these four factors can be useful in determining a baseline criterion for ranking any site.

Destruction of Old Chemical Weapons: Technologies under application

Dr. Thomas Stock

Chemical Weapons are banned under the Chemical Weapons Convention (CWC) which entered into force in 1997. Old Chemical Weapons (OCW) and Abandoned Chemical Weapons (ACW) presenting a special category of chemical weapons (CW) to be destroyed under the CWC.

The regime for declaration, verification and destruction has been agreed upon under the CWC. However, from the perspective of technologies to be applied for the destruction the last decade has clearly proven that these categories of OCW are not always easy to handle and to destroy.

The presentation will review individual States Parties OCW destruction programs regarding efficiency, technology and challenges. The last decade has provided valuable experience in the destruction of OCW. Hereby certain technology approaches have been applied for the destruction of OCW and others have dismissed.

The presentation will evaluate applied mobile

and semi-mobile solutions and their potential application for destruction of sea-dumped CW. Under the aspect of applying certain recovery scenarios on sea-dumped CW the potential or no potential of these technologies is debated.

How safe is safe enough for chemical weapons destruction system?-as analogy of a Nuclear Facility

Joseph Kiyoshi Asahina, PhD, Kobe Steel, LTD

Kobe Steel Ltd.,(KSL) developed the entire system of survey, detection and identification of sea dumped chemical munitions at Port Kanda, followed by transportation, inspection, temporally storage and destruction of them. KSL is now engaged in many projects of destruction of chemical stockpile and non-stockpile in Japan, Belgium, the US and in China. Based on the lessons learned through these experiences, KSL constantly improves its technology to make it safer and more reliable.

In this process, systematic approach developed in nuclear engineering is very useful. The presentation includes but not limited to, the way to reflect the experience of nuclear engineering know how to chemical weapons destruction process development.

Unfortunately, however, unprecedented nuclear accident happened on March 11 at Fukushima Daiichi nuclear power plant site. It is too early to analyze the causes of the accident and describe the preventive or countermeasures of it. Meanwhile, the author wants to have a dialogue with the attendees about "How safe is safe enough?"

Deep Underwater UXO Clearance

Arthur Hollmann, The Netherlands

The main issue with diving is safety. Especially when you have objects who are laying on deep position, let's say over 100 ft over water depth, safety is imminent.

But the works is not only about safety, it's also about quality. How can you discriminate an explosive from a non-explosive on such a great depth, without any sight (you only can use your fingers, or maybe an extra light attached to the dive helmet can add some extra inches sight) and in an environment which is quit hostile to the human body (cold, decompression illness etc.)

Finally, when safety and quality is taken car off, you can speak of the quantity of object, which can be identified per day. For a contractor this is the most important questions, because he wants it done in the fastest and mostly cheapest way.

My presentation is about these tree topics, Safety, Quality and Quantity in relation to the number of UXO that can be identified per day.

Experience in the dive team, adjustment of equipment and proper planning give good results, which will be demonstrated in my presentation.

Underwater Munitions Location, Mapping, Analysis and Removal

Tom Rancich, CEO VRHabilis LLC

VRHabilis Diving Department is comprised of former US Navy Deep Sea Divers, Explosive Ordnance Disposal Technicians, and US Navy Special Warfare (SEAL) and Surface Warfare personnel. VRHabilis has been conducting operations to locate, map, analyze and remove unexploded ordnance from rivers, lakes, tributaries and coastal oceans around the United States since August of 2008. In that time, VRHabilis has removed thousands of pieces of ordnance and analyzed hundreds of underwater acres of ordnance pollution.

Treatise: Underwater ordnance presents a unique set of challenges, as well documented and understood by members of the International Dialogue on Underwater Munitions (IDUM). VRHabilis understands this unique set of challenges and has successfully operated with them over the last four years. The reason that VRHabilis has been successful in our endeavors is that our personnel have over 300 years of combined experience operating in every type of maritime environment completing extremely complex operations. That experience is critical for the following reasons:

1. The trend in the United States is to treat the underwater UXO problem the same as the land problem. This is fundamentally flawed. Not only must underwater sites be treated differently than land sites, but each underwater site must be treated differently, bringing to bear all possible solutions to develop the best course(s) of action. Though many sites will have similar assets applied to the solution, there will e no cookie cutter solution. Due to the dynamic nature of the underwater environment, an underwater UXO operation is distinctly unique from a land operation. UXO discussion on point one will juxtapose the VRHabilis Humpback Bridge Emergency Response with the Alderwood Lake Underwater UXO Sweep.

2. As the environment is dynamic so must be the solution. Flexibility in planning and execution of the production operation is a necessity in underwater UXO activities. That fact requires a different type of work force; one trained and encouraged to innovate and keen to be involved in the planning process. Discussion on point two will be analysis of deep water operations off the coast of Martha's Vineyard.

3. The problem facing IDUM is a production problem; a production that must be safe, efficient, cost effective, and beneficial. The underwater UXO defense explosives i.e. mines, in military operations. That expertise must be balanced with professionals with production experience. Discussion on point three will juxtapose shallow water mine operations in Desert Storm with the Martha's Vineyard Time Critical Removal Action

The full development of this abstract will compile, analyze and compare years of successful experience in underwater operations and UXO removal. At the conclusion the audience will have a better understanding of problems encountered throughout the planning and execution of underwater UXO removal actions and subsequent solutions.

Adapting Remote Operated Non-Destructive Underwater UXO Remediation Technology for Casualty Response Associated with Offshore Natural Resource Development

James Barton, President, Underwater Ordnance Recovery Inc.

When offshore drilling operations experience a casualty best managed at the sea floor, the current response technology is limited to a complex and time consuming operation where heavy equipment is carefully lowered into place from floating platforms located thousands of meters above the worksite. This is difficult under the best of circumstances, and all but impossible in waters such as can be found in the North Sea or off the coast of Newfoundland; where only a few months before the Deep Water Horizon disaster, a well was successfully drilled to a record breaking depth directly on top of a known US munitions dump. A remote operated sea floor based heavy lift capacity patterned after Underwater Ordnance Recovery's "Ordnance Harvester" could be instrumental in reducing the time it takes existing response technologies to clear the associated debris field and remedy the casualty.

Investigation of chemical munitions dumpsite in the Bornholm Basin using geophysical and chemical methods

Martin Söderström, Finnish Institute for Verification of the Chemical Weapons Convention

The MERCW project ("Modelling of Ecological Risks Related to Sea-Dumped Chemical Weapons"; EU Commission FP6 Priority project, contract No. 013408) was a consortium project between ten research institutes/companies. In 2006–2008, the consortium studied the dumpsite in Bornholm Basin in the south-western Baltic Sea, where ca. 32,000 tons of chemical weapons (containing ca. 11,000 tons of toxic agents) were dumped after World War II in 1947–1948. This paper presents the results of two consortium members.

Considerations on Magnetometer Systems for Underwater UXO Detection

Dr.-Ing. Kay Winkelmann, Sensorik & Systemtechnologie GmbH

Increasing offshore activities, e.g. the construction of wind parks, an increasing number of sea cables and pipelines as well as environmental protection require detection and recovery of UXO and discarded munitions in offshore environments. After World Wars I and II and during the Cold War, huge quantities of ammunitions were dumped offshore. Other UXO and ERW in maritime environments stem from World War II, in particular in coastal waters.

On land, magnetometer systems and TDEM electromagnetic systems are typically applied for UXO detection. Generally, these systems can also be used for underwater detection of UXO. However, this requires careful planning considering UXO types and sizes to be detected, water depths in the area of investigation, carrier platform design, sensor array guidance and sensor array distance over ground, obstacle detection and avoidance, and type(s) of sensors applied on an underwater UXO detection system.

The presentation outlines the general problem of geophysical underwater UXO detection considering typical underwater UXO items and clusters and their geophysical expression. Based on this, the presentation develops the technical specifications that a magnetometer system for underwater UXO detection must fulfill for successful offshore application.

Topics addressed include magnetometer type comparison and selection of suitable magnetometers for underwater UXO detection, necessary spatial and magnetic resolution of underwater surveys for UXO detection, maximum allowable distances between magnetometers and seabed for successful UXO detection, general carrier design concepts for different depths and carrier platforms, design considerations for underwater magnetometer arrays to prevent induced magnetism noise, obstacle detection and avoidance concepts for magnetometer arrays, magnetic noise considerations for the maritime environment, and finally detection limits for underwater UXO detection using magnetometer systems. Practical examples collected over more than a decade illustrate the presentation.

Summary of Recent Underwater Munitions Surveys and Associated Methodologies

Richard Funk, Robert Feldpausch, Ryan Cross

This presentation will present a discussion of a series of recent geophysical surveys for underwater munitions and explosives of concern (MEC) and unexploded ordinance (UXO) utilizing new and different technologies and procedures, as well as traditional technologies in new ways. Combining extensive marine geophysical survey experience, and innovative sensor development and integration of proven commercial off-the-

shelf systems, it is possible to do efficient, cost effective, wide area assessment, or full coverage surveys for MEC/UXO. Tetra Tech has developed a methodology to combine high resolution acoustic survey data, including multibeam sonar bathymetry, sidescan imagery, and sub-bottom profiling, with their Marine Gradiometer Array (MGA) and Towed Electromagnetic Array (TEMA) systems; to reliably detect and accurately locate underwater MEC/UXO.

In 2010 Tetra Tech performed MEC/UXO surveys using the wide area assessment technologies and survey methods at four separate sites within the United States. These included an Environmental Security Technology Certification Program (ESTCP) sponsored demonstration survey off the South Beach remediation site at Martha's Vineyard, MA, Lake Michigan off Naval Station Great Lakes, IL, Ostrich Bay, WA, and NAS Patuxent River, MD. At each site a high resolution multibeam survey was conducted to obtain bottom topography, and identify features of interest or objects that could pose hazards for the towfish sensors. Data were then collected with the MGA and/or TEMA systems to locate metallic targets, whether exposed or buried, and to help discriminate targets of interest. At the Martha's Vineyard site, a combination sub-bottom profiler and high resolution side scan system was also used to help characterize the site through mapping of sediment types and detailed imagery of the exposed features on the bottom.

The combination of sensors, combined with appropriate sampling strategies, was used to determine the distributions of possible MEC/UXO within the survey areas (including adjacent to piers), aid in the discrimination of background geologic anomalies and debris, and localize the targets of interest with sufficient accuracy to support refinement of conceptual site models and planning and prioritization of remedial investigation and remediation efforts. These systems were able to provide this capability in water depths ranging from the surf zone, to over 100 feet, in a range of weather conditions and sea states.

The Remotely Operated Underwater Military Munitions Recovery System (ROUMRS)

John Jocughlin, ARA Inc.

In 2009, the US Deputy Assistant Secretary of the Army (DASA) for the Environment, Safety and Occupational Health (ESOH) issued a Performance Work Statement (PWS) for the design, development and demonstration of a remotely operated underwater munitions recovery system (ROUMRS). The Virginia Company, ARA Inc. (ARA), established a team with Oceaneering International Inc. to develop and manage the technical approach to accomplish the contract objectives.

The technologies applied to ROUMRS are readily available "Commercially Off the Shelf" (COTS) technology, and are in daily use in the oil and gas industry to depths of 10,000 feet and regular use for search and recovery to 20,000 feet. The US Government has identified the demonstration site at Ordnance Reef, off the west coast of the island of Oahu in Hawaii, and the National Oceanic and Atmospheric Administration (NOAA) has performed a site survey of the location.

Because it is difficult to obtain precise coordinates for underwater targets of interest, the platform for the system must have the maneuverability to perform a search around the provided coordinates (± 5 meters). A tethered, but free "swimming" remotely operating vehicle (ROV) was chosen, the Sub Atlantic Comanche 19, since the working environment at Ordnance Reef, as well as other potential work areas, are ecologically-sensitive and / or soft sediments may be present, either of which may limit or prevent bottom contact. The ROV is capable of working to depths of 300 feet. Figure 1 shows an early conceptual drawing of the ROUMRS system transferring underwater military munitions (UWMM) to a salvage basket for transfer to the surface. The manipulators for ROUMRS are mounted on the operations platform. The manipulators are electrically-operated and capable of fine operations. The Manipulators are capable of taking hold of, manipulating and lifting a variety of munitions and debris ranging from small arms ammunition, medium and large caliber projectiles, up to eight inches in diameter, and bomb shapes that weigh up to 150 lbs. The ROV tracking is accomplished by having a Global Positioning System (GPS) that is located on the surface vessel. The GPS gives the position of the surface vessel. In turn the surface vessel, whose position is known through the GPS, communicates location to the ROV through an ultra-short baseline (USBL) tracking system.

A Hybrid AUV/ROV offshore system: Seaeye Sabertooth

Mr. Chris Roper, Roper Resources, Bert Johansson, Saab Underwater Systems AB, Jan Siesjö, Saab Underwater Systems AB

Increasing use and complexity of subsea installations has put focus on the costs of maintaining these systems. In addition, access to these systems is sometimes limited by adverse weather and ice conditions. Conventional methods for intervention, maintenance and repair (IMR) using surface ships and ROVs are very expensive furthermore are response and mobilization times slow. To address this Saab Underwater Systems is in the process of developing a hovering Hybrid AUV/ROV system to remotely perform IMR without or strongly reduced need for a supporting ship. This system is based on the Double Eagle SAROV, a hovering Hybrid AUV/ROV in production for the military market and proven components from Saab Seaeye ROV product range.

This paper will present the Seaeye Sabertooth offshore system, its concept of operation and design. It will also present our cooperation projects with a number of companies for this system.

Clearing 49 munitions from Gulf of Finland for Nord Stream pipelines: Impact assessment and monitoring results

Tiina Salonen and Simon Bonnell, Nord Stream AG, Romke Bijker, Witteveen+Bos Consulting Engineers

In total 49 munitions have been cleared from the seabed of the Finnish part of the Gulf of Finland prior to the installation of the Nord Stream pipelines. The Nord Stream Project concerns the installation of two parallel 48" gas pipelines from Vyborg in Russia, to Lubmin in Germany, through the Baltic Sea, with each pipeline being 1224 km long. Many WW I and II munitions were encountered along the planned route of the pipelines and clearance was necessary to ensure their safe installation and long term integrity.

The performance of the munitions clearance in the Finnish EEZ required water permits. In permitting, the key issues were (1) the impact of spreading of sediment and contaminants from the craters and (2) impacts of the shock waves; the latter potentially causing damage to marine life, wrecks, cables and barrels with possible hazardous content.

In the Environmental Impact Assessment (EIA) phase impacts from munitions clearance were assessed on a generic level. As part of the permitting process, all impacts were studied in detailed assessments on a munition-by-munition basis.

The paper will present the permitting process and main findings of the environmental impact assessments regarding water quality and pressure waves (the predicted impacts) as well as the related monitoring results (actual impacts). More in particular, the paper will present suggestions for improved prediction of crater dimensions, as the actual crater sizes were much smaller than assumed, and elaborate on the observed peak pressures.

The overall impact of the Nord Stream munitions clearance activities was assessed to be minor and the results of the monitoring confirmed that the impacts were even less than predicted. This major finding and other lessons learned will be presented in the perspective of possible future infrastructure projects in the Gulf of Finland.

The Burgas Dredging Project. Multidisciplinary thinking as an incentive towards Pragmatic Solutions in a Maritime Environment

Bart Van der Speeten, aDeDe

Even on land, the total UXO issue is a complex one. Resolving the underwater UXO problem is even more challenging. One might agree that it's a understatement that underwater chemical UXO can be dealt with by a simple approach that is only based on technical knowledge of ordnance. It involves military technology, knowledge about economics, geology, marine biology, human behavior, physics, marine technology and activities.

The problem complex also involves considerable uncertainty as to the quantities and typology of the UXO present, and how sensitive these are to physical impacts.

This means that the entire UXO problem must often be dealt with on the basis of judgments and estimations, rather than on objective facts or calculated risks, which can be exceedingly difficult to establish with any certainty.

Each complex issue demands its proper solution. The dredging of the Burgas channel is an example of multidisciplinary thinking as an incentive towards pragmatic solutions in a maritime environment.

The evaluation process was built on the three-tiered process consisting of the following steps.

Step 1. Compilation of UXO facts.

Step 2. Uncertainty analysis.

Step 3. The Burgas dredging project. Multidisciplinary thinking as an incentive towards pragmatic solutions in a maritime environment, Risk evaluation and selection of measures to be taken.

On the Burgas project, multidisciplinary consultation and the implementation of a set of well-considered measures allowed for a pragmatic and cost-efficient, yet safe handling of the UXO problem. This lecture will give an insight of the methodology used, and humbly hopes to raise some reflections in the search for a qualitative handling of underwater UXO hazards.

Advanced Integrated Marine Characterization Technologies for Munitions Applications

Dr. Jack Foley, Sky Research, Inc.

This presentation provides information on a suite of underwater munitions characterization technologies applied to a Site Investigation (SI) and Time Critical Removal Action (TCRA) performed at the Port of Seattle, WA, USA. These technologies were applied through coordination and oversight by the US Army Corps of Engineers, Omaha. The Port of Seattle site includes Terminal 91 which is the home of a large fishing fleet as well as a large cruise ship terminal. Initiated by the discovery of discarded military munitions during routine port security dives, this project required a very rapid start-up and accelerated pace of execution to support the TCRA.

The Port of Seattle project was successfully executed and included several integrated technology deployment steps which will be presented. Conducted during a period of approximately 4 months, this project included many new and innovative applications of technologies. The site around and under Pier 91 has a footprint of 25 acres (10.1 ha), water depths of 40 -70 ft (12 - 21 m), and water temperature approximately 40 degrees F (4.4 C).

Project phases and technologies included; initial dive reconnaissance with former Navy EOD divers, multi-beam sonar for bathometry, side scan sonar for surface target identification, sub-bottom profiling for sediment characterization, diver sea-bottom visual searches, SkyDiver marine geophysical mapping system, remotely operated vehicles (ROV) for visual and sonar searches, and ROVs equipped with EM geophysical sensors for target detection and interrogation. Additionally, three integrated underwater positioning systems were used to support the accurate collection and integration of all datasets within a comprehensive geographical information system used on site.

The sequence, utility, and cross-utilization of each of technology component will be presented and discussed.

Impact of Underwater Detonations on Marine Vertebrates

Sven Koschinski, Marine Zoologist, Nehmten / Germany

Blasting creates several risks to marine vertebrates. The immediate shock pulse can cause injury at considerable distance. Different sound velocities impacting on tissues of different densities can lead to laceration and rupture. This applies especially to organs containing gas (ears, respiratory system, swim bladder and gastrointestinal tract). But also destruction of blubber, acoustic jaw fats (toothed whales) or liver (sharks) may result in fat embolism. Another effect is acoustic trauma, i.e. hearing damage. This effect can either be temporary (TTS) or permanent (PTS). Experimental measurements have been used to calculate safety distances for humans and cetaceans. For a 350 kg explosive charge lethal or severe injury is highly probable at 1.7 km for swimmers, 4.3 km for divers and 2.8 km for harbour porpoises. The PTS and TTS zones extend much further.

Low-order detonations lack the rapid rise of pressure that is characteristic of high-order detonations and thus are viewed as an alternative method for disruption of submerged unexploded ordnance that is considered unsafe to move. However, in low-order detonations the energetic conversion of the charge is incomplete. As a consequence, highly toxic substances add to the waste stream.

Risk Mitigation Strategies Applied in Eastern Canada for Deep Water Exploration in Areas impacted with Conventional, Chemical, and Radiological Weapons

Mr. Terrance P. Long, Chairman, IDUM

The objective of this abstract is to identify and suggest a course of action to mitigate potential risks during deep water (2000 meters) exploration and development activities from Munitions and Explosives of Concern (MEC). For more many years off the east coast of Atlantic Canada, Oil and Gas Exploration and Development been managed under the Canada-Newfoundland and Labrador Off-Shore Petroleum Board (C-NLOPB) and the Canada-Nova Scotia Off-Shore Petroleum Board (CNSOPB). In the implementation of their mandates, the role of the Boards is to facilitate the exploration for and development of the hydrocarbon resources in eastern Canada's Offshore Area in a manner that conforms to the statutory provisions for: worker safety; environmental protection and safety; effective management of land tenure; maximum hydrocarbon recovery and value; and, Canada/Nova Scotia/Newfoundland & Labrador benefits.

Off the east coast of Canada there are more than 3000 uncharted off shore underwater munitions sites. From the 1940's up till the 1960's major dumping of munitions by the Canadian and US Militaries occurred in between Nova Scotia and Newfoundland in deep water in the Laurentian Trench and Laurentian Fan. The closure of U.S. military installations in Newfoundland and Labrador, particularly at Argentiaand Stephenville, among others, was a source of widespread munitions dumping on the East Coast of Canada. It is reported that from Argentia large transport vessels made numerous trips to dump at sea. One such vessel, the USS Calhoun County, made four trips in October 1960 for ammunition disposal. Although some records do exist, we do not have a full understanding of what was dumped.

There is a possibility of an energetic event of a fuzed munitions brought about through unintended physical disturbance, the presence of even one large bomb in direct contact with subsurface infrastructure can be problematic. An increase in galvanic action associated with iron bombs and projectiles for instance, can overcome the periodic maintenance schedule of cathode protection not engineered to cope with this kind of interference. Friction alone can play an important role. Munitions can migrate due to occasional and sometimes dramatic "surge" events in currents found on the sea floor. In short pipelines and other bottom structures can be damaged through this process, creating costly environmental spills and loss of production while difficult repairs are made.

The Potential Effects of SEISMIC Exploration on Sea Dumped Chemical and Conventional Munitions

Mr. Terrance P. Long, Chairman, IDUM

Do you remember the Second World War movies when submarines were located by sonar equipment sending down sound waves that bounced back off the hulls of the submarines? The theory is the same, but the modern-day technology is immensely different. The abstract will explore the relationship between seismic and its potential to detonate underwater munitions or break open chemical weapons thereby causing a rapid chemical release. The question is after 40 years in the water what effects if any will seismic exploration have on underwater chemical and conventional munitions. Today's seismic testing is performed by ships deploying up to 30 air guns towed at a depth of five to seven meters below the sea's surface. The air guns eject high-pressure air bubbles every 10 to 12 seconds into the water and the resultant pressure wave is used as the sound source. The sound is focused downward through the sea bed and bounces off the layers of various rock types back to the surface where hydrophones located on 6,000-metre-long cables record their arrival times, which are used to determine the geological formations. According to information published by Hunt Oil, one of the companies that were involved in exploration off the coast of Canada states sound in a radius of five meters from the air guns is at the level of 260 decibels, which is considered lethal. Up to 2,000 meters away, the sound is still at the 190-decibel level, which Hunt Oil considers to have possible physical effects on marine life.

Munitions, by their very nature, are sensitive to shock. All explosives are shock sensitive and therefore can be exploded by mechanical shock, such as that created from an energy pulse. An explosive is a chemical material that, under the influence of thermal or mechanical shock, decomposes rapidly with the evolution of large amounts of heat and gas. Different types of underwater munitions vary in their likelihood of detonation. Standard military explosives are reactive to varying degrees, depending on the material, conditions of storage, or environmental exposure. Precautions must be taken to prevent their reacting with other materials. The sensitivity of underwater munitions largely depends upon the nature and condition of the explosive fillers and fuses and interactions in their environment.

The Statement of Canadian Practice on the Mitigation of Seismic Noise in the Marine Environment, which was released for comment on February 19, 2005 which does not make any mention of sea-dumped unexploded munitions. A procedure called "ramping up" is now being used. This procedure involves slowly increasing the decibel level of the sound used in seismic testing to frighten the fish into leaving the area before dangerous levels of sound are employed. The November 2004 resolution of the 16 member states of the Agreement for the Conservation of Marine Mammals in the Black Sea, Mediterranean Sea and adjoining Atlantic area, which called for "extreme caution" in conducting activities that produce intense underwater noise.

Overview of US Army Efforts Relating to Legacy Underwater Munitions

Geoffrey Carton, J. C. King

US Department of Defense (DoD) ocean-disposed excess, obsolete and unserviceable munitions from the early 1900's to 1970. US Armed Forces established procedures for ocean disposal of military materials as early as 1917. When chemical warfare materials (CWM) were added to the U.S. military arsenal, these procedures, which became more stringent over time, were revised to address sea disposals involving CWM.

The US Army 3Rs (Recognize, Retreat, Report) Explosives Safety Program

Geoffrey Carton, J. C. King

Members of the public are often unaware of the potential hazards associated with munitions and need information about what to do if they encounter or suspect they have encountered one. The Army's 3Rs Explosives Safety Education Program relies on a consistent, easily understood, and memorable message. The "3Rs" message (Recognize, Retreat, Report) is the basis for programs informing the public of the potential hazards associated with munitions.

Locating and Evaluating Sea Disposed Munitions-Examples from the Hawaii Undersea Military Munitions Assessment (HUMMA) Project

Geoffrey Carton, CALIBRE Systems, Inc

The Army funded HUMMA to develop procedures for characterizing sea disposal sites and to assess the potential risk to human health posed by sea-disposed munitions at a deep water (300 to 600 meters) site (Site HI-05) south of Pearl Harbor, Hawaii where both conventional and chemical munitions were believed to have been disposed.

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The origins of the work of the Inspection for Environmental Protection date back to September 1980, when pursuant to the new Act on environmental protection and development the Council of Ministers issued an ordinance on the National Inspection for Environmental Protection. These legal acts constituted the foundation for the work of the inspection and implemented a uniform system serving to control compliance with environmental protection regulations and examine the state of the environment across the country.

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LASEOD provides MEC/UXO services for any situation, including emergency response, characterization, investigation and remediation. The highly trained, highly motivated staff has worked at various sites throughout the world including formerly used defense sites, active military bases, post conflict sites, munitions manufacturing and storage facilities and commercial/private property.

Underwater Remediation

LASEOD employs all military trained EOD divers for projects involving underwater MEC/UXO contamination. LASEOD utilizes advanced underwater navigation and ordnance detection equipment. Our goal is the location, identification and neutralization or disposal of hazardous ordnance located below the water line.

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LASEOD is skilled in the maintenance and reconfiguration of active military ranges. This includes locating, identifying and disposal of MEC/UXO, the collection, inspection, certification and disposal or recycling of munitions and range debris and the removal, maintenance or replacement of range targets.

Environmental Consulting

LASEOD offers professional consultation and expert advice for regulatory agencies and other entities to assist in the making of informed and prudent decisions with regard to hazardous waste and munitions issues.

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aDeDe has gained a vast reputation and experience, cooperating with most of the world's leading enterprises in the dredging business, and offering a set of sustainable solutions to counter the risks related to unexploded ordnance: from historical and geophysical research to diving operations and on-board assistance.

In liaison with the customer, our experienced staff tries to find a project specific solution for the problems related to the presence of explosives. Correct risk assessment leads to risk reduction, to improvement of safety, and to an increased productivity. We never lose sight of the fact that the safety of the individual comes first.

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SENSYS was founded with the development of a simple, but efficient piece of equipment for recording, digitizing, visualizing, storage and transfer of data from environmental surveys. The essential software program is called MAGNETO®. In addition, SENSYS developed a line of rugged, easy to use field-recording equipment called the Dataloggers. Further advances have allowed the integration of extremely accurate survey information from GPS. The results can be displayed on a map with centimeter accuracy. The tools to do this have been developed and refined by SENSYS. The tools include the ability to switch between different coordinate systems (local and global) and the utilization of most analog sensors available on the market for measuring at the surface, subsurface (borehole), and underwater. These systems are adaptable to changing tasks and project requirements.

VT Technology is a software development and consulting company specializing in the development of Virtualization management and security solutions on Microsoft Windows and .NET platforms. vtCommander provides a local GUI to manage Hyper-V R2 server. It supports Hyper-V technology on full and core installations of Windows Server 2008 R2 as well as on Microsoft Hyper-V Server 2008 R2, which is Microsoft's standalone free hypervisor product. vtCommander allows managing virtual machines, virtual hard disks and networks on both local and remote Hyper-V servers. You can use vtCommander to manage Hyper-V on Windows 2008 R2 core and Hyper-V Server installations without resorting to remote management via the Microsoft Hyper-V Manager or Virtual Machine Manager Server.

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Aqua Survey provides services in the following areas:

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* Benthic Grab Sampling and Taxonomy
* Toxicity Identification Evaluations
* Underwater Utility and UXO Markout Surveys
* Geophysical / Hydrographic Surveys
* Geotechnical Sampling
* Sediment Toxicology and Bioaccumulation Studies
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The Kobe Steel Group operates in a wide range of fields that provide the very foundation of society, including both the materials sector (iron and steel, welding, aluminum and copper) and the machinery sector (industrial machinery, construction machinery, engineering, and the environmental business). We also engage in diverse operations such as electric power supply, real estate and electronic materials.

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International Scientific Advisory Board (ISAB) on Sea-Dumped Chemical Weapons (SDW). The Hague

The inaugural meeting of the International Scientific Advisory Board on Sea-Dumped Chemical Weapons was held on 15-16 April 2010 in The Hague. The meeting was opened by Ambassador Vaidotas Verba (Permanent Representative of Lithuania to the Organization for the Prohibition of Chemical Weapons, OPCW) and chaired by Professor Stanislaw Witek of the Wroclaw Institute of Technology. The purpose of the board is to provide independent advice to the Government of Lithuania on scientific, technical and organizational aspects of dumped chemical munitions in the context of Lithuania's efforts to promote dialogue and bilateral and multilateral contacts in this area amongst interested governments and international organizations, including the European Union, the OPCW, other relevant international organizations and the United Nations. The board consists of 15 members who are scientists, academics and officials representing ten nationalities and who act in their personal capacities. The ISAB in The Hague officially provides independent advice to the International Dialogues on Underwater Munitions (IDUM).

Prof. Stanislaw Witek (Board Chairman)

Ambassador Vaidotas Verba
(Represented of the Government of Lithuania)

Major Gen. Ichiro Akiyama

Dr. Habil. Janina Baršiene

Prof. Alexander Gorbovskiy

Prof. S.I. Baranovskij

Mr. John Hart

Dr. Inz. Andrzej Jagusiewicz

Mr. Terrance Long CPSM. SSM. CD.

Dr. Ralf Trapp

Dr. Paul Walker (Co-Chairman)

Dr. Thomas Stock

Dr. Robert Mathews (Not Confirmed to the IDUM Board)

Notes: .....

Third International Dialogue on Underwater Munitions

April
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2011

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NOTES

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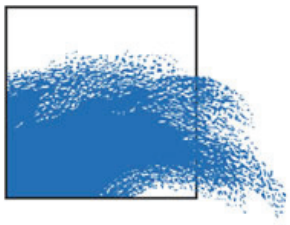

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