



2009

MARELEC

7-9 July 2009 Stockholm, Sweden

The world's foremost conference
on **marine electromagnetics**

Event Programme



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Image courtesy of Statoil Hydro

WELCOME FROM THE CONFERENCE CHAIRMAN

I extend a warm welcome and our sincere thanks to all scientists, organisations and companies for taking part in the 6th international conference on marine electromagnetics, MARELEC, in Stockholm in 2009.

"Marelec focuses on the areas of physics concerned with electromagnetic fields that occur in or interact with an ocean or marine environment. The emphasis of the conference is on fundamental principles as well as applications of these phenomena in a wide range of disciplines.

Our objective with this conference is to bring together international experts from different fields to examine the current

collective knowledge of electromagnetic phenomena in the marine environment.

Marine electromagnetics has applications in a wide range of disciplines including Geophysics, Geotechnical Engineering, Oceanography and Naval Warfare. Hence, this area of research is relevant to delegates from academic, industrial, theoretical, experimental and military backgrounds."

I look forward to meeting you in Stockholm at MARELEC 2009.

Dr. Peter Krylstedt
Conference Chairman

Director of Research, The Swedish Defence Research Agency, FOI



SOCIAL EVENTS

RECEPTION AT THE CITY HALL OF STOCKHOLM

Tuesday 7th July 2009
1900 hours

The Golden Room at the City Hall of Stockholm (pictured above) is one of the most historical and beautiful buildings in Sweden and will be the location for the opening night cocktail reception hosted by the City of Stockholm and the Swedish Defence

Research Agency (FOI). The building is well known internationally as the location for the annual Nobel Banquet. Free to attend for all conference delegates and their partners

CONFERENCE GALA DINNER

Wednesday 8th July 2009
1930 hours

The Gala Dinner will be held in the conference hotel, the Scandic Hasselbacken.

MARELEC 2009 COMMITTEE

Conference Chairman:

Peter Krylstedt
Director of Research, FOI – Swedish Defence Research Agency

Standing Committee Chairmen:

Alan Dudley
Leader, Naval Electromagnetics DSTL, UK

Nitin Bhakta
Senior Scientist – QinetiQ Fellow QinetiQ, UK

Committee:

Alastair Ballentine
Business Development Manager - Underwater Systems, QinetiQ, UK

Richard Bellerby
Team Leader
Maritime Non-Acoustics, DSTL, UK

Albert Blokland
EM Engineer
RNIN, Netherlands

Steve Constable
Professor in Residence, Scripps Institution of Oceanography, USA

Jean Louis Coulomb
Head of Ship Magnetism Laboratory
Laboratoire de Magnetisme du Navire

Zalina Dzhatieva
Geophysicist, UK

Nigel Edwards
Professor of Physics
University of Toronto, Canada

John Holmes
Senior Engineer
Naval Surface Warfare Center, USA

Eugene Lepelaars
Researcher, Radar & EW
TNO, Netherlands

Johan Mattsson
Managing Director
PGS Technology AB, Sweden

Corinne Rannou
GESMA, France

Leonard Srnka
Research Advisor
ExxonMobil Upstream Research Co, USA

Mike Wynn
Distinguished Scientist
Naval Surface Warfare Centre, USA

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TUESDAY 7TH JULY 2009

0900	Coffee	
	PLENARY	ROOM: SPEGELSALEN
Chair	Peter Krylstedt, Swedish Defence Research Agency, FOI, Sweden	
1015	Welcome from the Conference Chairman	
1025	Opening Presentation Helena Bergman, Director International Policy and Co-operation, FOI, Swedish Defence Research Agency	
1045	Wiring the underwater environment Professor Nigel Edwards, Professor of Physics, University of Toronto, Canada	
1125	Electromagnetics in future military systems and operations; a question of balance Dr Geoff Garnett, DSTL Fellow, UK	
1205	Lunch served in Restaurant Hasselbacken, followed by coffee served in Hazeliussalen	
1:	Environmental Noise	ROOM: SPEGELSALEN
Co-chairs	Laure-Line Rouve, Research Engineer Laboratoire de Magnetisme du Navire, France Peter Sigray, Director of Research Swedish Defence Research Agency, FOI, Sweden	
1310	Advanced Dynamic Magnetometer: Coupling nonlinear oscillators for fun and profit Dr Adi Bulsara, Senior Scientist, SPAWAR – Pacific, USA	
1335	Influence of internal wave ocean dynamics on magnetic surveys Will Avera, Geophysicist, Naval Research Laboratory, USA	
1400	Ranging in electromagnetically noisy environments Dr Samantha Davidson, Research & Software Team Leader, Ultra Electronics PMES, UK	
1425	Highlights from the Poster Programme	ROOM: SPEGELSALEN
Chair	Dr Alan Dudley, Principal Scientist, DSTL, UK	
1445	Coffee and poster session	ROOM: HAZELIUSSALEN
2:	Underwater Surveillance	ROOM: SPEGELSALEN
Co-chairs	Alastair Ballentine, Business Development Manager – Underwater Systems, QinetiQ, UK. Richard Bellerby, Team Leader, Maritime Non-Acoustics, DSTL, UK.	
1530	Application of target-based and noise-based methods in magnetic anomaly detection systems Dr Boris Ginzburg, Senior Researcher, Soreq, Israel	
1555	Electromagnetic signature feature extraction by time- frequency domain analysis for ship underwater identification Dr Odara Thongsamouth, Scientist, Royal Military Academy, Belgium	
1620	Surface effects of in-water turbulence resulting from flow over shallow variable seabed topography Dr Neil Stapleton, Principal Scientist, DSTL, UK	
1645	End of day 1	
1900	RECEPTION sponsored by the City of Stockholm and the Swedish Defence Research Agency, held at the City Hall	

WEDNESDAY 8TH JULY 2009

PARALLEL SESSIONS				
3&4:	EM Fields	RM: SPEGELSALEN	Underwater Surveillance	RM: BELLMANSALEN
Co-chairs	Eur Ing Albert Blokland, EM Engineer, RNIN, Netherlands Dr John Holmes, Senior Scientist, Naval Surface Warfare Center, USA		Alastair Ballentine, Business Development Manager – Underwater Systems, QinetiQ, UK. Richard Bellerby, Team Leader, Maritime Non-Acoustics, DSTL, UK.	
0930	Basic study of underwater laser propagation for high speed underwater vehicle communication Dr Hiroshi Yoshida, Researcher, Japan Agency for Marine-earth Science and Technology, Japan		Capacity of an electromagnetic gantry to protect an underwater access against intruders Dr Hugues Henocq, Engineer, GESMA, France	

0955	Multipole representation of the magnetic field vector and gradient tensor of extended magnetic sources: Conventions, expansion through hexadecapole order, simplified formalism, and an analysis of the inverse problem Dr Mike Wynn, Distinguished Scientist, Naval Surface Warfare Center, USA	Magnetic sensors operated from autonomous underwater vehicles for the application of buried target identification Dr Ted Clem, Magnetic Sensor Technology Manager, The Office of Naval Research, USA
1020	General treatment of a fully ellipsoidal permeable shell in a uniform magnetic field: Field vector, gradient tensor, multipole moments, and a test of a general multipole formalism Dr Mike Wynn, Distinguished Scientist, Naval Surface Warfare Center, USA	Detection of fresh groundwater bodies within the Mediterranean sub-marine coastal aquifers offshore Israel using marine geoelectromagnetic methods Dr Mark Goldman, Head of the Geoelectric Department, Geophysical Institute of Israel, Israel
1050	Coffee and poster session	ROOM: HAZELIUSSALEN

PARALLEL SESSIONS

5&6:	EM Fields RM: SPEGELSALEN	Underwater Surveillance RM: BELLMANSALEN
Co-chairs	Eur Ing Albert Blokland, EM Engineer, RNIN, Netherlands. Dr John Holmes, Senior Scientist, Naval Surface Warfare Center, USA	Alastair Ballentine, Business Development Manager – Underwater Systems, QinetiQ, UK. Richard Bellerby, Team Leader, Maritime Non-Acoustics, DSTL, UK.
1140	The development of FRP-propellers in the RNLN Ing. Piet van der Gaag, Naval Architect, Defence Materiel Organisation, Netherlands	Recursive Bayesian method for magnetic dipole localisation with a tensor gradiometer Dr Marius Birsan, Defence Scientist, DRDC Atlantic, Canada
1205	Magneto-mechanical effects under low fields and high stresses - Application to a ferromagnetic cylinder under pressure Gilles Cauffet, Professor Assistant, G2Elab, France	Development and applications of a universal dipole model Cye Waldman, Senior Scientist & Dr Michael Larsen, Deputy Division Manager, Information Systems Laboratories, USA
1230	The ELF magnetic field generated by the rotation of the NAB propeller Dr Marius Birsan, Defence Scientist, DRDC Atlantic, Canada	Method of auxiliary sources for marine EMI scattering problems Professor Fridon Shubitidze, Assistant Professor, Thayer School of Engineering, Dartmouth College, USA

1255 Lunch served in Restaurant Hasselbacken, followed by coffee served in Hazeliussalen

7:	Inverse Modelling ROOM: SPEGELSALEN
Co-chairs	Dr Mike Wynn, Distinguished Scientist, Naval Surface Warfare Center, USA. Dr Zalina Dzhatieva, UK
1400	KEYNOTE: Closed loop degaussing system applied to a double hull submarine mock-up Gilles Cauffet, Professor Assistant, G2ELab/ENSE3, France
1425	3D focussing inversion of multi-transient EM data in the frequency domain Jonathan Linfoot, Project Manager: Processing & Inversion, PGS, UK
1450	3-D Time-lapse modelling and inversion of multi-transient EM data over the North Sea Harding field Jonathan Linfoot, Project Manager: Processing & Inversion, PGS, UK. David Wright, Anton Ziolkowski: PGS; Ronnie Parr: BP; Christopher Limond, Ed Morris: PGS

1515 Coffee and visit to exhibition ROOM: HAZELIUSSALEN

8:	Inverse Modelling ROOM: SPEGELSALEN
Co-chairs	Dr Mike Wynn, Distinguished Scientist, Naval Surface Warfare Center, USA. Dr Zalina Dzhatieva, UK
1550	Ship corrosion diagnosis and ELF prediction from electrical measurements Arnaud Guibert, PhD in Electrical Engineering, G2Elab, France
1615	On the modelling of electromagnetic soundings of Marine environments applied to electromagnetic ranging and surveillance in an Archipelago Fredrik Silfverduk, Scientist, Swedish Defence Research Agency, FOI, Sweden
1640	Recent work at FOI on the modelling of Controlled Source Electromagnetic (CSEM) sounding of oil reservoirs Jan-Ove Hall, Scientist, Swedish Defence Research Agency, FOI, Sweden
1705	Forward magnetic ranging with towed sensors J Bradley Nelson Defence Scientist, & Troy C Richards, Defence Research & Development Canada Atlantic, Canada
1730	End of Day 2
1930	CONFERENCE DINNER

THURSDAY 9TH JULY 2009

9:	Marine Electromagnetics and the Search for Hydrocarbons	ROOM: SPEGELSALEN
Co-chairs	Dr Steven Constable, Professor, Scripps Institution of Oceanography, USA. Professor Nigel Edwards, Professor of Physics, University of Toronto, Canada. Dr Len Srnka, Chief Research Geoscientist, ExxonMobil Upstream Research Company, USA	
0930	KEYNOTE: Magnetic tensor gradiometry in the marine environment: Correction of electric and magnetic field and gradient measurements in a conductive medium and improved methods for magnetic target location using the magnetic gradient tensor David Clark, Principal Research Scientist, CSIRO Materials Science & Engineering, Australia	
0955	New joint modeling and inversion approach of 3-D marine MT and CSEM data for hydrocarbon exploration Professor Pascal Tarits, UBO-IUEM, France	
1020	Applying marine EM methods to gas hydrate mapping Dr Steven Constable, Professor, Scripps Institution of Oceanography, USA	
1045	Highlights from the Poster Programme	ROOM: SPEGELSALEN
Chair	Alastair Ballentine, QinetiQ, UK	
1105	Coffee and poster session	ROOM: HAZELIUSSALEN
10:	Marine Electromagnetics and the Search for Hydrocarbons	ROOM: SPEGELSALEN
Co-chairs	Dr Steven Constable, Professor, Scripps Institution of Oceanography, USA Professor Nigel Edwards, Professor of Physics, University of Toronto, Canada Dr Len Srnka, Chief Research Geoscientist, ExxonMobil Upstream Research Company, USA	
1140	Multi-transient EM repeatability experiment over harding field Dr David Wright, Senior Research Geophysicist, PGS, UK	
1205	Effects of VTI anisotropy, data coverage and initial models on marine CSEM Dr Len Srnka, Chief Research Geoscientist, ExxonMobil Upstream Research Company, USA	
1230	Title TBC Speaker TBC	
1255	Lunch served in Restaurant Hasselbacken, followed by coffee served in Hazeliussalen	
11:	Field Computation	ROOM: SPEGELSALEN
Co-chair	Dr Corinne Rannou, TEC/DDBF, GESMA, France	
1400	TEMCaPro - a tool for electromagnetic signature prediction of the cathodic protection system Dr. Eugène Lepelaars, Scientist, TNO Defence, Security and Safety, The Netherlands	
1425	Recent work at FOI on the computation of static electric signatures and the corresponding corrosion related magnetic signature Henrik Claésson, Senior Scientist, Swedish Defence Research Agency, FOI, Sweden	
1450	Boundary layer control using an oscillatory lorentz forcing Professor Manhar Dhanak, Department Chair and Director of SeaTech, Florida Atlantic University, USA	
1515	Coffee and visit to exhibition	ROOM: HAZELIUSSALEN
12:	Computational Methods	ROOM: SPEGELSALEN
Co-chairs	Dr Alan Dudley, Principal Scientist, DSTL, UK Dr Eugene Lepelaars, Scientist, TNO Defence, Security & Safety, Netherlands	
1600	Modelling eddy current effects using physical and numerical techniques James Ashton, Scientist, QinetiQ, UK	
1625	Part 1: Modelling UEP and CRM signatures generated by corrosion and corrosion control in ships, with detailed representation of the ICCP circuit and propellers. Part 2: Simplified modelling of UEP in electrolyte with depth-varying conductivity Dr Cristina Peratta, CP Simulation Engineer, CM Beasy Ltd, UK	
1650	Elements of the tsunami precursors' physics: Seismo-hydro-electromagnetics Oleg Novik, Head of the lab. for Dynamics of the Lithosphere-Ocean-Atmosphere System, Institute of Terrestrial Magnetism, Ionosphere and Radio Wave Propagation (IZMIRAN) of RAS, Russia	
1715	END OF CONFERENCE	



2009 MARELEC POSTER PROGRAMME PRESENTATIONS

NO.	POSTER TITLE	PRESENTER
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TUESDAY 7TH - WEDNESDAY 8TH JULY 2009

ROOM: HAZELIUSSALEN

Each presenting author in this section will also have the opportunity to make a short presentation on their poster within the main conference programme in Spegelsalen.

1	Electromagnetic Susceptibility Management - A Framework for effective exploitation of electromagnetic signature management systems	Alastair Ballentine QinetiQ Platform Systems, UK
2	Extraction of ground wave for CSEM	Brian Farrelly Senior Advisor - R&D MultiField Geophysics, Norway
3	Electromagnetic Underwater Signature Management: Signature design techniques and redeployable measurement systems	Samantha Davidson Research & Software Team Ultra Electronics PMES, UK
4	Long-term variability of underwater electric noise in the Port of Gothenburg	Stefan Petrovic Research Engineer Swedish Defence Research Agency - FOI, Sweden
5	SFOMF, A successful US Navy natural laboratory providing sustained ocean observation capabilities in the Florida Straits'	Dr William Venezia Chief Engineer Naval Surface Warfare Center, USA
6	GEM-Shark - Electromagnetic subsurface profiler for coastal and shelf research	Hendrik Mueller Geophysicist University of Bremen, Germany
7	Seafloor electrical measurements autonomous observatory in hydrothermal zones: the Elecromar Project	Dr Jean-Francois D'Eu Research Engineer Laboratoire Domaines Oceaniques, France
8	Novel electromagnetic seafloor receiver as compared to conventional systems	Thomas Nielsen Chief Technology Officer Quasar Geophysical Technologies, USA
9	Development of a high performance transportable multi-influence sensor for naval vessel ranging applications	Howard Jones Principal Engineer Ultra Electronics PMES, UK

THURSDAY 9TH JULY 2009

ROOM: HAZELIUSSALEN

Each presenting author in this section will also have the opportunity to make a short presentation on their poster within the main conference programme in Spegelsalen.

10	Time domain marine controlled-source electromagnetic survey in shallow water	Dr Steven Constable Professor, Scripps Institution of Oceanography, USA
11	Reducing signatures, corrosion, and costs with a well designed cathodic protection system	Barry Torrance Product Manager Aish Technologies Ltd., UK
12	Subsea wireless video link and its application to ROV docking	Mark Rhodes Engineering Manager WFS Ltd, UK
13	Static magnetic signature translation	Dr Eugene Lepelaars Scientist, TNO Defence Security & Safety, The Netherlands
14	A new radiomagnetelluric system and its application for foot, car-borne and boat-borne surveys	Alexander Saraev Director of the Center of EM Methods St Petersburg State University, Russia
15	EM sub sea bottom survey using underwater vehicle	Dr Hiroshi Yoshida Researcher JAMSTEC, Japan
16	Tsunami phenomenon & warning system	Dr Youry Sizov Scientific Manager Goelectromagnetic Research Centre of IPE RAS, Russia
17	New computationally effective method for modelling of ferro-magnetic signature for realistically specified surface ships	Pieter Schippers Scientist, TNO Defence Security & Safety, Netherlands

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Provide advanced low signature cathodic protection for stealthy submarines and ships, with over 70 man-years' engineering experience in the specification and design of ICCP systems specifically for ELFE, UEP & CRM reduction (deamping) of naval vessels. Aish is known for innovative approaches to minimizing corrosion-related signatures.

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