



Twentieth International Research Ship Operators Meeting (ISOM)
25 – 26 October 2006,
at the Marine Institute, Galway, Ireland

Attendees

Country	Representative	Organisation	e-mail address
Australia	Mr Fred Stein	CSIRO, Hobart	fred.stein@csiro.au
Belgium	Mr Andre Pollentier	MUMM	a.pollentier@mumm.ac.be
	Ms Anna-Maria Johansson	EU Commission	Anna-Maria.JOHANSSON@ec.europa.eu
Canada	Mr Don Belliveau	CCG-DFO	BelliveauD@mar.dfo-mpo.gc.ca
	Captain Ron Grady	CCG-DFO	GradyRo@DFO-MPO.GC.CA
Chile	Mr Enrique Aranda	IFOP, Valparaiso	earanda@ifop.cl
China	Prof Xiang Jianhai	IOCAS, Qingdao	jhxian@ms.qdio.ac.cn
	Dr Yu Jianjun	IOCAS, Qingdao	
	Dr Kong Xiancai	IOCAS, Qingdao	
	Dr Li Tiegang	IOCAS, Qingdao	tgli@ms.qdio.ac.cn
Denmark	Mr Steen Silberg	DIFRES	sts@difres.dk
	Mr Brian James Cowan	DIFRES	
	Captain Frode Larsen	DIFRES	frl@difres.dk
Finland	Mr Panu Hanninen	FIMR, Helsinki	panu.hanninen@fimr.fi
France	Mr Oliver Lefort	IFREMER	Oliver.lefort@ifremer.fr
	Mr Jacques Paul	GENAVIR	jacques.paul@ifremer.fr
Germany	Capt Wolfgang Klaassen	Briese, Leer	research@briese.de
	Dr Klaus van Broeckel	IFM-GOMAR, Kiel	kbroeckel@ifm-geomar.de
	Mr. M Lauer	Ledashipping	lauer@ledaship.de
Iceland	Mr Vignir Thoroddson	MRI, Reykjavik	vignir@hafro.is
Ireland	Mr John Breslin	MI, Galway	john.breslin@marine.ie
	Ms Aoife Kelly	MI, Galway	aoife.kelly@marine.ie
	Mr Michael Gillooly	MI, Galway	Mick.gillooly@marine.ie
	Ms Caitriona NicAonghusa	MI, Galway	Caitriona.nicaonghusa@marine.ie
	Mr Aodhan Fitzgerald	MI, Galway	Aodhan.fitzgerald@marine.ie
	Mr Alan Rowan	P&O Marine Services (Irl)	
	Mr Par Meier	P&O Marine Services (Irl)	
	Mr Barry Kavanagh	P&O Marine Services (Irl)	
	Mr bert Robertson	P&O Marine Services (Irl)	
	Mr Brian Garrad	P&O Marine Services (Irl)	
	Ms Josephine Harrison	P&O Marine Services (Irl)	
	Mr Bill Dwyer	P&O Marine Services (Irl)	
	Mr John Barry	P&O Marine Services (Irl)	
	Mr Dave Lyons	National Parks and Wildlife	
	Ms Elizabeth Sides	National Parks and Wildlife	
Japan	Capt Masataka Zaitso	NME, Yokosuka	zaitso@nme.go.jp
	Mr Tetsuo Uchida	JAMSTEC, Yokosuka	uchidat@jamstec.go.jp
	Mr Tetsuya Yokota	JAMSTEC, Yokosuka	yokotat@jamstec.go.jp
Netherlands	Dr Marieke Rietveld	NIOZ, Texel	rietveld@nioz.nl
New Zealand	Mr Fred Smits	NIWA, Wellington	f.smits@niwa.co.nz
	Mr Greg Foothead	NIWA, Wellington	g.foothead@niwa.co.nz

Norway	Mr Per Nieuwejaar	IMR, Bergen	per.nieuwejaar@imr.no
	Mr Hans Petter Knudsen	IMR, Bergen	hans.petter.knudsen@imr.no
Portugal	Dr Luis Menezes Pinheiro	University of Aveiro	lmp@geo.ua.pt
Scotland	Mr John Morrison	Marlab	j.morrison@marlab.ac.uk
Spain	Prof Juanjo Dañobeitia	CSIC/UTM, Barcelona	jjdanobeitia@cmima.csic.es
UK	Mr Edward Cooper	NOCS, Southampton	ebc@noc.soton.ac.uk
	Mr Geraint West	NOCS/UKORS. Southampton	gerw@soc.soton.ac.uk
	Cdr David Lewis	NOCS, Southampton	dlewis@noc.soton.ac.uk
	Dr Helen Beadman	NERC	habe@nerc.ac.uk
	Mr David Blake	BAS, Cambridge	dmbl@bas.ac.uk
	Mr Nigel Lyman	CEFAS, Lowestoft	nigel.lyman@cefasc.co.uk
	Mr David Morris	CEFAS, Lowestoft	david.morris@cefasc.co.uk
USA	Prof Dennis Nixon	URI, Kingston	dnixon@uri.edu
	Dr Mike Reeve	NSF, Arlington	mreeve@nsf.gov
	Cdr Elizabeth White	NOAA, Silver Springs	elizabeth.white@noaa.gov
	Mr Daniel Rolland	Alion Science	drolland@alionscience.com
	Mr Peter Kilroy	Alion Science	
	Mr Bill Clarke	DARD	
Apologies for Absence			
Australia	Jonathan Reeve	Aus Gov Antarctic Division	jono.reeve@aad.gov.au
Canada	Marc Andre Poisson	DFO	PoissonMA@DFO-MPA.GC.CA
France	Jean-Xavier Castrec	IFREMER	Jean.Xavier.Castrec@ifremer.fr
	Jacques Binot	IFREMER	jbbinot@ifremer.fr
	Olivier Lefort	IFREMER	olivier.lefort@ifremer.fr
Iceland	Vignir Thoroddsen	Marine Research Institute	vignir@hafro.is
India	G JanakiRaman	NIOT	janaki@niot.res.in
Indonesia	Ridwan Djamaluddin	BPPT	ridwan@webmail.bppt.go.id
	Yudi Anantasena	BPPT	ananta@webmail.bppt.go.id
	Kemal Sinatra	BPPT	kemals@barunajaya.com
United Kingdom	Bill Meadows	CEFAS	bill.meadows@cefasc.co.uk
	Mike Webb	NERC	mweb@nerc.ac.uk
USA	Liz Sandeman	Marine Connection	liz@marineconnection.org
	Liz Tirpak	Dept of State/OES	TirpakEJ@state.gov
	Dolly Dieter	NSF	edieter@nsf.gov

1. Opening Session

The Opening Session was chaired by **Ms. Marieke Rietveld**.

Welcome and Introduction of the Marine Institute. The 59 participants, from 19 different nations and one international organisation were warmly welcomed to the Irish Marine Institute in Galway by **Dr Peter Heffernan**, the Chief Executive of the institute.

Following the official welcome **John Breslin** gave a presentation about the Marine Institute. The institute is the national agency responsible for Marine Research, Technology Development and Innovation (RTDI), seeking to assess and realise the economic potential of Ireland's 220 million acre marine resource; to promote the sustainable development of marine industry through strategic funding programmes and essential scientific services; and to safeguard the marine environment through research and environmental

monitoring. The Marine Institute provides a broad range of statutory services related to marine research and development, consistent with Irish and EU legislation. Under the Marine Institute Act, the MI has the role:

“ to undertake, to co-ordinate, to promote and to assist in marine research and development and to provide such services related to research and development that, in the opinion of the Institute, will promote economic development and create employment and protect the marine environment”

The Institute has seven service areas:

➤ **Fisheries Science Services**

FSS role is to research, assess and advise on the sustainable exploitation of the marine fisheries resources in the waters around Ireland.

➤ **Marine Environment and Food Safety Services**

MEFSS provides scientific advice and a range of marine environmental monitoring services to help ensure Irish seafood products meet approved quality standards.

➤ **Ocean Science Services**

OSS support national and international marine research programmes through three teams:

- **Research Vessel Operations** manage the Marine Institute’s research fleet. The 65m long RV *Celtic Explorer* is a highly sophisticated low-noise multipurpose research vessel designed for undertaking a wide array of offshore and deep-sea survey operations. The RV *Celtic Voyager* is a 31.4m multipurpose vessel suited to coastal research and offshore survey operations.
- **Advanced Mapping Services** carry out routine hydrographic and geophysical mapping for the Irish National Seabed Survey, the Integrated Mapping for the Sustainable Development of Ireland’s Marine Resource (INFOMAR) and benthic fisheries projects.
- **Oceanographic Services** provide comprehensive oceanographic services, including the National Weather Buoy Network, Irish tide gauge network, ocean modelling and satellite remote sensing.

➤ **Irish Maritime Development Office**

The IMDO is dedicated to the development and promotion of the Irish shipping services industry.

➤ **Strategic Planning and Development Services**

SPDS identifies and catalyses opportunities offered by new and emerging marine sectors.

➤ **Aquaculture and Catchment Management Services**

ACMS has research and monitors and provides advice on finfish aquaculture, salmonid rearing, wild salmon & eel stock and catchment studies.

➤ **Corporate Services**

Corporate Services supports the each of the Marine Institute service areas to deliver a consistent and high quality service in line with the objectives and priorities of the Institute.

Introduction of Participants

All participants gave a short introduction of themselves and the country and organisations they represented

Adoption of Agenda and Review of the Minutes of Nineteenth Meeting

Ms Marieke Rietveld, the stepping down chair, invited comments on the agenda, which was adopted with minor additions. She then invited comments on the minutes of the 19th ISOM, which were adopted as a true record of the ISOM2005 meeting held in Chennai, India, 25 – 26 October 2005. The final version of the minutes is available on the ISOM web site (<http://www.isom-info.org>)

Marieke then thanked everyone for their contributions to ISOM and noted that it had been a privilege to chair ISOM for the past years. She believed the years had been very productive. ISOM has grown considerably from a small group of ship operators to a world wide platform. She thanked everyone, and handed over the chairmanship of ISOM to Per Nieuwejaar.

Mr Per Nieuwejaar invited **Prof Dennis Nixon** to extend a word of thanks on behalf of the ISOM community to Marieke, which he gladly did with his usual eloquence. Mr Per Nieuwejaar, the Chair of ISOM, continued with his opening address and thanked the meeting sponsors and the Irish organisers, and especially everyone of the Marine Staff who had worked so hard to make this meeting a success.

2. Keynote Address: The Mysterious Life and Death of Salmon at Sea

Dr Ken Whelan, President of the North Atlantic Salmon Conservation Organisation (NASCO)

Dr Whelan gave a most interesting presentation on NASCO, in which Canada, Denmark (in respect of the Faroe Islands and Greenland), the European Union, Iceland, Norway, the Russian Federation and the United States of America are the Contracting Parties. The widely migrating wild salmon stocks from more than 2000 salmon rivers flowing into the North Atlantic require rational management which can only be achieved through international cooperation and since 1984, NASCO has provided a forum for such cooperation. Unfortunately this 20 year period has been difficult since stock abundance has declined strongly. NASCO agreements have greatly reduced the interception by a Contracting Party of salmon originating in the rivers of other Contracting Parties. The interception fisheries accounted for 30% of the total harvest at their peak prior to 1984, but for less than 0.5% of the harvest in 2003. Recently NASCO established the International Atlantic Salmon Research Board to stimulate research and links with NGO's and with the private sector. The Board primary aims are to cooperate on research into the causes of marine mortality and counteractive measures, to maintain an inventory of relevant research and identify gaps, and to raise funds to finance major new research projects.

3. Delegates Reports of Activities

Captain Fred Stein (Australia – CSIRO Marine) reported on the Australian research fleet activities, in particular on the RV *Southern Surveyor*. CSIRO are studying the options for replacement of the ageing *Southern Surveyor*. The Australian Antarctic Division (AAD) is working on upgrading the Australian ice breaker/supply/research vessel *Aurora Australis* in conjunction with this vessel's owner and operator P&O Marine Services. During the last year CSIRO has lost one CTD at the East Australian coast. CSIRO is developing a new data acquisition system for the *Southern Surveyor* and possibly for the replacement vessel.

Mr Andre Pollentier (Belgium – MUMM) informed the meeting that Belgium currently operates two research vessels: the 30-year old *Zeeleeuw* and the newer *Belgica*. Approval has been obtained for the replacement of the *Zeeleeuw* by a 30-35m long catamaran, while studies are underway towards a 65m vessel to replace the *Belgica* in about 7 years. A new fibre-optic winch has been purchased for the operation of a ROV in up to 2,000m water depths. During the year a fishing net had been caught in the propeller of the *Belgica*, which took the vessel out for eight weeks.

Mr Don Belliveau (Canada – CCG/DFO) advised that major changes have occurred or are underway in the Canadian government operated vessels. In 1995 the two civilian fleets (Coast Guard and Department of Fisheries and Oceans) comprised a total in excess of 200 ships, which has now been reduced to 110. The *Hudson*, 45 years old, needs urgent replacement. A new coastal trawler is programmed for the East Coast of Canada for 2011, another for the West-Coast a few years later. New 40 meter long patrol vessels are currently under construction, to be followed by ice breakers. The new ice breakers, scheduled for 2011-2012 are being designed to be able to break ice at 16 knots. Currently Canada operates 17 ice breakers, and in spite of global warming the need for ice breakers remain as much ice comes from the north. The Canadian Coastal Service has taken responsibility of these vessel with an annual budget of CAN\$24M for refitting and CAN\$25M for a vessel sustainability fund.

Mr Enrique Aranda (Chile – IFOP) reported on the Chilean research vessel fleet, comprising three research vessels. The research vessel *RV Abate Molina* which is operated by the Instituto de Fomento Pesquero, with home base in Valparaiso, has completed 272 days at sea mainly doing stock assessment by

mans of hydroacoustics, particularly studying anchovies. Enrique reported that the Chilean government had approved US\$700,000 for new equipment, while he is hopeful that funding for new research vessels will also be forthcoming in the next year.

Prof Xiang Jianhai (China – IOCAS) presented the meeting with an overview of IOCAS, detailing the history of the institute, the management structure and various operational support systems. IOCAS has four ocean going research vessels with the newest vessel RV *Ke Xue San Hao*, meaning Science Number 3, delivered on 28 July 2006 to the institute. This vessel built by the Wuchang Shipyard has an overall length of 73.9m, beam of 10.2m and a displacement of 1,224 tonnes. RV *Ke Xue San Hao* is well provided with winches, sounders, laboratories, lifting frames and cranes and has now completed three scientific voyages.

Mr Steen Silberg (Denmark – DIFRES) reported on the replacement program for the 78m RV *Dana* and the 60m RV *Gunnar Thorson*. A ship renewal working group has been set up, comprising personnel from DIFRES and a new National Marine Service Centre, which will be created in 2007 as part of the University of Denmark (DTU) together with other Danish institutes and universities. Alternatives under evaluation are a mid-life refit of the *Dana*, a new 65m mainly fisheries research vessel and closer cooperation with other nations. New equipment purchased last year included a benthic sledge for lobster research, various multi-media platforms and a shared satellite connection on the *Dana*. Steen also gave a detailed overview of the Galathea 3 voyage, an eight months long scientific world voyage of the 112m *Vaeddere*, initiated by the Danish Priminister. The naval vessel required considerable modifications to be suitable for the scientific studies, including the fitting of six container laboratories, a CTD and a comprehensive ethernet and satellite communications network to accommodate the 30 journalists on board.

Mr Panu Hanninen (Finland – FIMR) advised that RV *Aranda*, Finland's research flag ship, completed eleven voyages between January and August 2006, after which the crewing contract with the current vessel operators, Finstaship, was terminated. The new operator will be Meriaura Oy, providing new crew, while some 120 cruise days are scheduled for next year. During autumn modifications were made to the engine room, with upgrades to the bridge navigational systems scheduled for next spring. A fishing net was lost which fouled the screw of RV *Aranda*.

Mr Jaques Paul (France – Genavir) provided the meeting with a good overview of the French research vessel fleet and their ownership and operation. Genavir is a shipping public company dedicated to operate oceanographic vessels and equipment which are being used by several laboratories or institutes. Genavir comprises a group of companies that operate the research vessels of Ifremer, the main French marine research institute, and of CNRS, IRD and CEMAGREF. Ifremer owns four large ships *Pourquoi pas?*, *L'Atalante*, *Thalassa*, *Le Suroît*, three smaller vessels *L'Europe*, *Gwen Drez*, *Thalia*, two submarines, Nautille and ROV Victor 6000 and other specialised marine research equipment. The company employs some 220 seamen, 100 technicians and 20 administrative officers. The year 2005-2006 was the first operational year of *Pourquoi pas?*, and included trials, finalising of her equipment and the successful first multidisciplinary cruise (Vicking). New developments included a survey measurements module on ROV Victor, a penetrometer, an AUV and an multibeam halieutic sounder, which all will be transferred to Genavir in 2007. The total activities of the deep sea Ifremer fleet covered 988 days, including transits and RV *Pourquoi pas?* trials. One gravity corer was lost.

Dr Klaus van Broeckel (Germany – IFM-GEOMAR) represents the commercial shipping company who operates a part of the German research vessel fleet, including the new RV *Maria S. Merian*. This 95m long, 19.2m beam state-of-the-art research vessel has been commissioned in 2006 after completing sea trials. The vessel was built for Euro 53.8 Million. The *Maria S. Merian* is very well provided with

laboratories, winches, lifting frames. She has a high ice class rating, dynamic positioning (up to wind force 8) and can carry 23 scientists. Within the next ten year the RV *Sonne* will need to be replaced.

Mr John Breslin (Ireland- Marine Institute) reported on the two multipurpose research vessels owned by the Marine Institute (MI): RV *Celtic Voyager* and RV *Celtic Explorer*. The *Celtic Voyager* had been at sea for 183 days during 2006 and the *Celtic Explorer* 287 days. Much of the work of both vessels is related to the Marine Institute's own research work, but for a considerable part of the time the vessels are chartered out to other research agencies or to the oil and gas industry. One of the year's highlights was drilling programme investigating cretaceous and Jurassic sources of oil using the MeBo Robotic Drill Rig funded by the Irish Shelf Petroleum Studies Group. The operation of the vessels was officially transferred to P&O Maritime Services (Irl.) Ltd. in March 2006. The *Celtic Voyager* is currently undergoing a major refit including the reconditioning of the engine, propeller and gearbox, installation of air-conditioning systems, upgrade of the IT facilities and the fitting of a seamless generator switch-over function. Plans for the installation of an "always-on" broadband communication system on the *Celtic Explorer* are well underway.

Mr Tetsuya Yokota (Japan - JAMSTEC) reported on the JAMSTEC fleet activities in 2006. JAMSTEC owns and operates seven research vessels RV's *Natsushima*, *Kaiyo*, *Yokosuka*, *Kairei*, *Mirai*, *Hakuho-Maru* and *Tansei-Maru*, the drill vessel *Chikyu* (see below), the manned submersible *Shinkai 6500*, the ROVs *Hyper Dolphin* and *Kaiko 7000* and AUV *Urashima*. The seven research vessel completed 2002 cruise days at sea, or an average of 286 days per vessel. The *Shinkai 6500* spent 73 days at sea, *Hyper-Dolphin* 147 and *Kaiko7000* 21 days. Mr Tetsuya Yokota told the meeting about the successful recovery of the lost *Keo2* mooring buoy in November 2005, and the improvements made to the *Kaiko 7000* by adding a second manipulator, increasing thruster output and improving the payload. Like all ship operators JAMSTEC is badly affected by the increasing fuel prices and is about US\$700M "in the red" because of the unforeseen increase in fuel expenditure. Tetsuo asked if anybody had any innovative ideas for how to reduce the extra costs for fuel.

Mr Yokota advised that the *Urashima* had been able to sail a distance of 314 km using a single fuel cell to power the propulsion system! Another impressive result is the dive of *Kaiko 7000* down to 7031m depth! JAMSTEC reported on a number of equipment losses and the probable causes for the losses. Tetsuo also reported on the large increase in fuel costs and asked if anybody had any innovative ideas for how to reduce the extra costs for fuel.

Captain Masataka Zaitzu UCHIDA (Japan – NME) described progress on the new 210m drilling vessel *Chikyu*, which is currently undergoing operational testing aiming to be ready for the International Test Operations mid-2008. The high fuel price will delay the final commissioning of this great new Japanese vessel.

Mr Greg Foothed (New Zealand – NIWA) reported that NIWA continues to operate RV *Tangaroa* (70m), RV *Kaharoa* (28m), and the 10.5-meter hydrographic survey launch SL *Pelorus*. During the year *Tangaroa* was at sea for 254 days and *Kaharoa* 272 days, which included a 122-day ARGO-deployment voyage across the Pacific from Wellington to Valparaiso (Chile), onto San Diego, and then via the midden-America's back to San Diego and returning to Wellington in May 2006. Two major vessel equipment problems were experienced. *Tangaroa* had serious gearbox problems caused by a pinion wheel of the power-take-off shaft coming loose from the shaft, while *Kaharoa* experienced a blown head gasket during a near-shore survey and, although the damage could have been fixed at sea, the vessel was towed to port. NIWA's equipment replacement programme for *Tangaroa* continued this year with the replacement of on-board computers, a Fleet 77 satellite communications system, a new oily water separator and a hydraulic bow crane, while *Kaharoa's* 24-year old generators were replaced by two Volvo-Penta 90kW units.

Ms Marieke Rietveld (Netherlands - NIOZ) reported on the activities of NIOZ's 66m RV *Pelagia*, that had completed 260 operational days, including 24 barter days with NERC and 20 days charter. *Pelagia* spent 30 days in drydock, which allowed for the fitting of a Kongsberg IMRAD EM300 multi-beam echosounder. Ms Rietveld described the design options for the installation of the EM300: either flush mounted or by means of a add-on gondola. The later option was selected, which while reducing the vessel speed by about 1 knot, provided excellent data even in adverse sea conditions. other new developments at NIOZ include a ultra-clean CTD system, an underwater digital video recording system, a high pressure sampler, a colour analysis module for XRF-Core scanner, a fast thermistor string, a mobile vehicle for ocean floor research, a moonpool on the new Texel ferry and a larval collector.

Dr Luis Menezes Pinheiro (Portugal - University of Aveiro) described the two Portugese fisheries research vessel accessible to the University of Aveiro. For other research work two Naval vessels can be used, which are fitted with multi-beam echosounders plus a new seismic system. These vessels will be used during 2007-2008 for UNCLOS delimitation surveys and the Universities are restricted in getting access. During the next year the research institutes plan to charter a Russian vessel, but Dr Pinheiro would prefer to charter a dedicated research vessel from other ISOM members. Also seeks collaboration for geology/geophysics vessels.

Dr John Morrison (Scotland – FRS) reported that Fisheries Research Services operates two fisheries research vessels FRV *Scotia* (68m) and FRV *Clupea* (32m), and that maintaining these sea-going facilities and achieving a set number of operational days at an agreed cost per day is a key target for FRS. The *Scotia* was utilised for 290 operational days for a wide range of data-gathering activities and experimental purposes, with fishing stock assessment cruises accounting for over 55% of the time. Two short cruises (5%) were carried out to provide biological data for an oilfield development and a further two cruises (12%) in the North Sea and the Faroe-Shetland Channel were devoted to gathering time series data in relation to long term ocean climate change. Despite several breakdowns, the 38-year old *Clupea* operated remarkably well and completed 253 days at sea. In January 2006 a £4million contract to build a 27m replacement vessel for the ageing *Clupea* was awarded to Macduff Shipbuilders Ltd. The new vessel will have a very versatile deck arrangement, a good range of winches and cranes, and twin main engines and propellers for flexibility and safety. The vessel is due to be delivered in August 2007.

Prof Juanjo Dañoibeitia (Spain - CSIC) reported on the Spanish research vessel fleet consisting of five vessels, three owned by the CSIC: the 70m *Sarmiento de Gamboa* which was delivered in 2006, the 37m *Garcia del Cid*, and the 24m *Mytilus*. SCIC also operates the two vessel belonging to the Spanish Navy, the 82,5m Antarctic vessel *Hesperides*, and the 40m Antarctic Stations vessel supplier *Las Palmas*. IEO owns a part of the 75m French/Spanish vessel *Thalassa*, the 67m *Cornide de Saavedra*, the 30,5m *F. P. Navarro* and the 24m *Odon de Buen*, while MAPA owns the 53m *Vizconde de Eza*, the 30m *Emma Bardan* which was recently launched in 2006, and a 70m vessel which is under construction. Prof Dañoibeitia presented a detailed pictorial overview of the construction of RV *Sarmiento de Gamboa*, and described her very impressive technical and scientific capabilities. The total estimated cost of the *Sarmiento de Gamboa* is Euro 44 Million.

Mr Geraint West (UK – NOCS/UKORS) informed the meeting about the NERC fleet of vessels: RSS *Discovery*, *Charles Darwin*, *James Clark Ross* and the newly completed *James Cook*, replacing the *Charles Darwin*. The vessels completed some 350 days at sea, while a further 150 seadays were secured through bartering arrangements with Belgium (*Belgica*), Germany (*Poseidon*) and the USA (*Ron Brown*). The *James Cook* has been commissioned with extensive seatrials programmed for the second half of 2006. Plans are well underway for the replacement of RV *Discovery* for which £60million will be made available by NERC.

Dr Helen Beadman (UK – NERC) spoke of the newly set up National Marine Facilities by NERC, aiming to rationalise and facilitate future marine research. Specific areas targeted are improved ship utilisation, containerised operations and integration of underwater vehicles.

Mr Ed Cooper (UK – NOCS) showed the meeting an impressive Power Point Presentation of the construction and commissioning of the *James Cook*, recently built in Norway. The *James Cook* is a state-of-the-art research vessel with a wider range of sounders, optimised for container operations and provided with Dynamic Positioning. The vessel is scheduled to commence scientific deployments as from March 2007.

Mr David Blake (UK – BAS) reported on the activities of the British Antarctic Survey (BAS). A midlife refit for RSS *James Clark Ross* is not scheduled, but the vessel will be continually upgraded and during maintenance in 2005 a multi-beam system was installed. The vessel was for 330 days at sea. The second BAS vessel, RSS *Ernest Shackleton*, was engaged in 120 days of oilfield support work in North Sea in 2005, followed by logistics work and limited science work in Antarctica. The vessel returned to the North Sea in the summer of 2006. The main upcoming challenges for BAS are to improve operating efficiency, to reduce hydrocarbon use, to achieve ISO14001 and to acquiring a third ship to support the rebuilt of the Halley VI station.

Mr Nigel Lyman (UK – CEFAS) described RV *Cefas Endeavour* to the meeting. This 73m multi-purpose research vessel was built by Ferguson Shipbuilders Ltd, Glasgow, UK, in 2003. The vessel is very well provided with winches, A-frames, laboratories etc and has a diesel electric propulsion system. RV *Cefas Endeavour* is an acoustically quiet vessel, meeting ICES209 and is provided with DPI system, using a HiPAP500 as positional reference system. During 2005/06 she spent 270 days at sea.

Cdr Elizabeth White (USA – NOAA) updated the ISOM members with the technical issues associated with the commissioning of the state-of-the art fisheries research vessel FRV *Oscar Dyson*. This very advanced, 63m long vessel failed the ICES209 acceptance tests and experienced considerable difficulties in the electric propulsion motors. The excessive noise was created by incorrect engine weight distributions and the shock-mounts design and the noise levels have now substantially been reduced. The problems with the electric propulsion motors resulted from failure of the commutators and the manufacturers of the motors have proposed considerable modification to ensure the safe operations of the vessel. Sister ships of the FSV1 *Oscar Dyson*, the FSV2 *Bigelow*, the FSV3 *Pisces* and the FSV4 ???? are in various stages of completion / ordering.

4. Underwater Sound and Marine Life – Outcome Galway Workshop

Geraint West (UKORS) reported on the outcomes of the pre-ISOM meeting workshop on **Underwater Sound and Marine Life**, held at the Marine Institute in Galway on 24 October 2006. Geraint updated the ISOM members on developments related to the “acoustic pollution” caused by the sounders and seismic equipment used by research and survey vessels, and the impact on operations. In the United States for instance an environmental impact statement/assessment is now required under the Marine Mammal Protection Act before any seismic cruise is undertaken. Private consultants prepare such a document at a cost of \$50K to \$100K which is then submitted to NOAA, who normally requires six to nine months to review the document. Consequently it now takes approximately 12 months to organise a seismic cruise. Marine mammal observers on seismic and naval vessels are now common practise. Passive acoustic monitoring and post-cruise environmental reports will be more required in the future, while the un-predictability of host nations as to whether seismic surveys will be permitted in their waters make planning of research voyages difficult and time consuming. Geraint provided a detailed overview of the status of current research and legislation in the UK and Europe, including permits procedures, checklists and recommendations for operations and mitigation measures.

The Galway workshop agreed to develop an international protocol, which will be drafted by John Breslin, Dennis Nixon, Geraint West. This protocol will be circulated in the coming year, aiming to agree on the recommendations during the ISOM meeting in Qingdao. **The protocol would also include a compendium of international guidelines, which Geraint West offered to compile.** All ISOM members are requested to submit any guidelines / recommendations / legislation that exist in their country. The members also agreed to collate practical experience of mitigation strategies.

5. Future Plans on Research Fleets and Marine Infrastructure

Cdr Elizabeth White (USA – NOAA) reported on the “US Draft Federal Oceanographic Fleet Plan”, recognizing three research and survey vessel classes: global, ocean and regional vessels. By the year 2015 19 of the 45 ships in the NOAA fleet will need to be retired. The current agency budget requests will be sufficient to introduce seven new ships, with a further nine additional ships in NOAA’s plans, including two Ocean Class research vessels. By 2025 17 additional ships will reach their 30-year service life and will need to be replaced. Cdr White also informed the ISOM members about the NOAA Tsunami warning system upgrade, including 39 new (or upgraded) DARTII stations in the Pacific and Atlantic.

Dr Mike Reeve (USA – NSF) described the developments in the NSF fleet of vessels. A competitive solicitation will be issued for a new Alaska Region Research Vessel, aiming to have this vessel operational by May 2010. Three new Regional Class Research Vessels are in the design stage with the construction contract to be issued by Fall 2007 and the consecutive construction and outfitting of the vessels between 2007 and 2013. The outfitting of the seismic research vessel RV *Langseth* is well underway with new multi-channel seismic equipment purchased and NSF expects the vessel operational in 2007. **The design of the ALVIN replacement is well underway** and it is anticipated that this HOV (Human Occupied Vehicle) will be operational by 2010 at a current estimated cost of US\$23-24M. Dr Reeve also explained the difficulties associated with the major increase in the cost of operating research vessels, which has increased by nearly 50% in the last four years, and the resultant decline in vessel use. During 2002 the average operating cost per day was US\$12.4k, but this has now risen to \$18.7k. The daily cost of the Ocean Class ships is about US\$28k.

Captain Fred Stein (Australia – CSIRO) reported on the status of the **35-year old RV *Southern Surveyor*, which is due for replacement.** A workshop shared by Fred earlier in the year identified a need for five research vessels in stead of one, also noting that 20% of the world oceans fall under the national jurisdiction of Australia. Five vessels are financially and operationally not feasible and Australia is therefore looking at replacing the *Southern Surveyor* with one multi-capable vessel. Closer vessel collaboration in the Austral-Asia region would be very desirable and Captain Stein suggested a meeting of regional research vessel operators in six months time in Australia, for instance in May 2007.

EU-ESFRI and FP7 (European Commission - Anna-Maria Johansson). Ms Johansson detailed the history of the European Research Infrastructure Frame Work programmes from FP1 (1984-1987 to FP7 to be implemented between 2006 and 2013. **The main focus for FP7 is collaborative research within Europe and with International collaborators,** including industrialised countries such as the US and Japan, as well as developing countries. The European commission has made a total of some Euro50Trillion available over seven years. The Research Infrastructure is wide-scaled and includes basic research, innovation and education.

ISOM members were also informed about **ESFRI, the European Strategic Forum on Research Infrastructures**, that was launched in April 2002 and brings together representatives of the 25 Member States, 7 Associated States, and one representative of the European Commission (EC). The role and ambitions of ESFRI are to jointly reflect on the development of policies for pan-European Research

Infrastructures, to prepare a European Roadmap (with regular updates as different areas mature) and to act as an incubator for concrete RI projects with pan-European interest, but it is not a decision making body. Within this framework the ESRI Roadmap aims to identify new research infrastructures or major upgrades which correspond to the needs of European research communities, and will provide a tool for decision makers, preventing over-provision of facilities in particular areas. The Roadmap will also provide a focus for long term budgetary planning by funding actors.

Marieke Rietveld (Netherlands – NIOZ) presented an overview of **MarinERA, an EU initiative to facilitate the coordination of the national and regional marine programmes within Europe**, and represents 15 partners, 13 funding organisations and 13 countries. MarinERA aims to provide a strategic and operational platform between national, EU and international structures to reduce fragmentation and duplication; to close gaps; to enhance coordination of access to / use of marine research infrastructures; to establish common marine research programmes; and to facilitate reciprocal opening of national marine programmes. MarineERA is working on an inventory of four categories of specialist marine research infrastructures, namely 1. research vessels and related infrastructures, 2. marine observing and monitoring systems; 3. land based large scale facilities and 4. data management facilities.

Ms Rietveld also reported on progress of the **European Ocean Research Fleet Working Group (OFWG)**. The OFWG has prepared a draft plan that includes an inventory of the current European research vessel fleet and major equipment that will provide a basis for decision making on future investments in marine infrastructure, including fleet renewal. The plan also gives an overview of the existing management and funding processes and existing partnerships providing a basis for improvement and possibilities for further collaboration. The working group has made an analysis of the academic European fleet and has divided the ships in Global Class (11), Ocean Class (15) and Regional Class (20). The European research fleet is ageing and a replacement strategy has been developed for the period 2005 – 2025 that identifies the need for the building of 18 Regional, 8 Ocean and 6 Global class vessels.

A third presentation by Marieke covered the **activities of the Ocean Facilities Exchange Group (OFEG), a group comprising six European agencies: NERC, BMBF, IFREMER, NIOZ, CSIC and since 2006 IMR**. OFEG facilitates the exchange of shiptime and major pieces of equipment based on the ‘bartering’ principle, and also include joint cruises. The exchange is based on “value points” according to scientific capacity as agreed between members. The participating fleets cover 14 large research vessels, ROV Victor, submersible Nautile, TOBI, SAR, multichannel seismics, mobile compressors and laboratory containers.

6. Other Reports

European Research Vessel Operators Meeting – ERVO (John Breslin – MI). The 8th ERVO Meeting (ERVO 2006) was held at the Iceland Ministry of Fisheries, Reykjavik, Iceland on 19th – 21st June 2006. In total eleven countries were represented at the meeting which was attended by 19 persons. A Workshop on Sea Mammal Mitigation Measures was held during the afternoon to help pave the way for the establishment of a common code of practice for research vessel operators to help prevent disturbance to cetaceans during research activities. Many of the issues discussed during the ERVO are also on the agenda of the current ISOM meeting and not further discussed here. The participants agreed that John Breslin would become the Chair for the coming two years and that Dr Juanjo Danobeitia would continue to be the Vice-Chair.

INMARTECH 2006 (David Blake - BAS). The 2006 INMARTECH was held at Woods Hole Oceanographic Institute and was very well attended by some 90 marine technicians from many countries. The main areas of interest were IT and data acquisition facilities. The “Show and Tell” session, whereby

participants gave a talk about “things they did well or not so well” in less than five minutes was very well received. **IFREMER has offered to host INMARTECH2008 in Toulon, France.**

7. Marine Insurance and Liability

Prof Denis Nixon (US – UNOLS/NSF) reported on developments in the international marine insurance markets. **By the end of August 2006 it was estimated that the worldwide insurance premiums (excluding P&I from mutual P&I Clubs) totalled US\$17.8 billion.** Interestingly **the number of large vessels (>100 GT) have increased by about 12% since 1995**, while the gross tonnage has increased by 35%, and therefore the size of vessels is increasing. The insurance premiums have not increased much during the last two years and, given that **the gross annual loss is less than 70% of all premiums paid up**, it is considered that the insurance premiums will remain static for at least another two years. Prof Nixon also presented an overview on the causes leading insurance claims and human error is by far the single most reason at some 60% (deck officers 25%, deck crew 17%, shore personnel 8%, pilots 6%, and engineers 4%). Photographic evidence of recent collisions / major losses illustrated this fact.

Dennis Nixon also ran through a number of **US liability cases where sailors have sued their employers** after being injured. One case involved an injury caused by grease being carried in a coffee can leading to the cook slipping on the deck; one case involved serious injury by a marine technician while was underway in a van from the airport to the vessel; and two diving accidents.

One issue identified by Prof Nixon that is of direct concern to research vessel operators is associated with **accidental death of crew from life boat drills**. Extensive advice recently published by UK Maritime and Coastguard Agency in a draft marine guidance note on measures to prevent accidents with lifeboats. In May 2006 the Maritime Safety Committee approved a draft amendment to SOLAS regulation III for adoption in December 2006. The amendment requires that for free-fall launching, the crew shall board the lifeboat, properly secure themselves, and commence simulated launch procedure up to, *but not including*, the actual release of the boat. The rest of the drill, being the actual launching or lowering will only see the required operating crew on board the lifeboat

Another area that needs urgent attention is the **development of an International Environmental Code of Conduct for research vessels**. The United Nations Secretariat has reported on the effects of scientific research on the environment. Undoubtedly parts of scientific research have an impact on the environment and a Code of Conduct is required without delay. Please refer to ISBN 90-04-14521-4; Martinus Nijhoff Publishers: “Marine Scientific Research, The Operation and Status of Research Vessels and Other Platforms in International Law”, Florian H.Th. Wegelein.

8. Safety and Security Issues

Captain Masataka Zaitzu (Japan – NME) reported the impact of the US Oil Pollution Act of 1990 (OPA’90) on research vessels entering US waters. OPA’90 was triggered by the *Exon Valdez* disaster in Alaska in 1989 and aims to minimise the risk of oil spills. An application under OPA’90 involves the following documents/organisations/ actions: Certificate Of Financial Responsibility (COFR) - Federal COFR and in cases a State COFR (California and Alaska) -; a Qualified Individual (QI) - Federal QI and possibly a State QI (California)-; Vessel Response Plan (VRP) - Federal VRP and a possibly a State VRP (California)-; a Spill Management Team (SMT); a local Oil Spill Recovery Organisation (OSRO); a designated Salvage company and a documented Exercise. It is stressed that compliance with the OPA’90 is compulsory for all vessels and that operators need to allow adequate funds and time to obtain the permission to enter US waters.

Captain Ron Grady (Canada – CCG/DFO) discussed the **Canadian Code of Nautical Procedures and Practices** and posed the following questions for the meeting to discuss later during ISOM2006 or at some future date:

- How are night time operations conducted in other countries with respect to science requirements near or on the navigational bridge while the vessel is being navigated at night?
- How are planned annual refit costs determined?
- Is refit a percentage of the vessel's operating costs?
- Is LCM practices employed for determining costs?
- Are refit and maintenance costs adjusted as vessels age?
- How is the core crew determined (officers and crew) determined for each RV ship? Are the scientists involved in the seamanship aspect (launch and recovery of equipment and/or systems), or is this the responsibility solely of the officers and crew?
- Is double (or more) occupancy a problem in your fleet?

Marieke Rietveld (Netherlands – NIOZ) gave a brief update on **piracy problems and war zones**. The years 2005-2006 have seen a slight increase in piracy particularly around Ivory Coast. Of concern is the growing level of organised piracy and **powerful weaponry used by pirates**, including electronics, machine guns etc.

Marieke Rietveld (Netherlands – NIOZ) also presented a very good **Power Point Presentation developed by NIOZ for all new personnel arriving on the Dutch research vessel RV *Pelagia***. The presentation covered all usual safety items, as well as issues related to smoking and the use of alcohol, communications, etc. Marieke advised that all ISOM members are welcome to use and modify the presentation for their own use.

9. Diplomatic Clearance

Aiofe Kelly (Ireland – MI) presented the **Code of Practice for Marine Scientific Research within Ireland's Special Areas of Conservations**. In June 2006 the Irish Government announced to designate four marine sites as Special Areas of Conservation (SACs) under the provisions of the 1992 Habitats Directive aiming to protect resident cold water coral reefs and to maintain at "favourable conservation status". The four sites are located in the Belgica Mound Province, the Hovland Mound Province, the South-West and North-West Porcupine Bank areas. Marine scientific research within or adjacent to the any of the SACs is a "Notifiable Action" requiring authorisation from the Irish Government. Some specific requirements for obtaining scientific work permits are:

- ROV operators must have at least one year experience;
- towed bottom sampling equipment is prohibited;
- value of samples collected is to be maximised for example by working with other science agencies etc;
- permits can be revoked / amended at any time;
- physical contact with reef is to be avoided;
- the Irish Government shall have access to all data and imagery upon request;
- for multibeam and seismic surveys soft start-ups are mandatory, break in output > 5 minutes prior to full start-up is required, while marine mammal observers (qualified & experienced) will have to be on board during all multibeam and seismic surveys

10. High Latitudes

Fred Smits (New Zealand – NIWA) gave an overview on the **developments of shipping regulations in the Arctic/Antarctic**. The IMO guidelines for the operation of ships in Arctic waters are now well accepted, while the modifications for the Antarctic Treaty Areas as proposed by COMNAP (Council of Managers of National Antarctic Programmes) are still pending and subject to IMO review/acceptance.

During the July 2006 COMNAP in Hobart the SHIPOPS (Ship Operators) work group agreed to **finalise the 2005 inventory of acoustic systems (sounders and seismics) used by research vessels in the Antarctic Treaty Area**. A further inventory towards **the use/discharge of ballast water** in Antarctica was discussed as well as **the use of heavy oils (MDO and HDO) fuels by research vessels**.

The **COMNAP members agreed to a closer working relationship with the International Hydrographic Office**, which has set up an Antarctic subcommittee to study the need for navigational aids and better hydrographic charts in the waters below 60°South. There was lengthy discussion by the members as to what data should be made available to IHO, as submission of data institutes a potential liability for the submitting nation. It was felt by most that it was **better to submit lesser quality data than no data at all**. Captain Frode Larsen (Denmark) advised that the quality of the Arctic Hydrographic charts is very poor.

Fred Smits also reported on progress towards the **International Polar Year** and the collaboration between the High Latitudes scientific community. As usual funds are tight and lack of moneys may result in some limitations of the outcomes of IPY.

11. Data Handling, Databases, Web Portals and Public Outreach

Brian James Cowan (Denmark – DIFRES) presented a detailed overview of the **data handling and storage on the *Feadderen*, the Danish naval vessel used for the Galathea3 expedition**. The vessel has circumnavigated the globe conducting many scientific studies during the voyage and data storage handling, archiving was a major issue. DIFRES developed a Ship Information System (SIS) that was used by the *Feadderen* and will be implemented on board the current Danish research vessel *Dana*. SIS was written as a Windows application using the Microsoft.Net 2.0 language C#. The current version of SIS can provide the use of seamaps, depth models, satellite pictures, special maps such as sediments and fishing ground maps, and special layers for instance wrecks and reefs, pipelines and platforms. The software has powerful communications features including database synchronisation, using satellite, wireless links or web services. SIS can extract data from land databases and provide presentation application over the Internet. It also provides for a “click once application update”. Planned improvements of SIS include the recording of more sensors, and more integrated mapping, such as underwater videos and side scans, multi-beam and habitat maps.

Hans Petter Knudsen (Norway – IMR) presented the **hydrographic data handling and storage on the recently built RV *G O Sors***. The IMR research vessels are mostly occupied with measurements of the living resources and environment, whereby the survey instrumentation is used for detailed studies and contributes to the main seabed mapping projects as conducted by other Norwegian institutions, such as the Norwegian Hydrographic Service. Geologists of the University of Bergen use the survey instrumentation for seismic and geological surveys to support deep sea coring and the investigation of hydrothermal vents.

Marieke Rietveld (Netherlands – NIOZ) advised the ISOM Members on **progress on the International Research Cruise Database and Website under POGO**, the Partnership for Observations of the Global Oceans. POGO is a forum created in 1999 by directors and leaders of major oceanographic institutions around the world to promote global oceanography, particularly the implementation of an international and integrated global ocean observing system. In December 2003, 28 world leading institutes from 17

countries signed the Yokohama Declaration: “In situ global ocean observations are an essential component of the earth observing system. Such ocean observations must be delivered by a combination of existing and new programmes and platforms. These observations will deliver a variety of products to meet societal needs. The Partnership for Observation of the Global Oceans (POGO) is uniquely positioned to contribute to the implementation of an ocean observing system”. During POGO-6 in Brest, December 2004, a Working Group was formed to investigate the set up of an International Research Cruise Database and Website with main objectives to access to information on research cruises, future and past cruises. The Working Group identified that free and easy access to past and future cruises with a link to each research vessel’s home page is essential. The database has to be searchable and user-friendly, with a starting point by clicking the world map (standard JCOMM), with ship location in the Marsden square grid. Basic features of the database include the vessel name (linked to ship’s web page), call sign, country, departure and arrival port, departure and arrival dates, area, Marsden squares, specific experiment and discipline, Chief Scientist and funding agency, berths available (Yes/No) and links to other relevant websites. **The principal features of the database have been agreed upon, funding has been provided by the Sloan Foundation, while an international tender has been issued for the set-up and population of the data base.**

John Breslin (Ireland – MI) advised that the Irish Marine Institute is the national agency responsible for Marine Research, Technology Development and Innovation and that part of that role is **working with the wider marine community through events, education and public outreach**. In the future, the responsibility for the development of Ireland’s 220 million acre marine resource will lie in the hands of today’s school children, and the Institute therefore undertakes an active schools outreach scheme, which is integrated with the Social, Environmental and Scientific Education (SESE) curriculum. The Research Vessels are an ideal platform for school’s education programmes, provide a novelty value and children are fascinated by the experience. The school visits are organised on board the vessel with the collaboration of scientists and crew. The MI provides the vessels at a subsidised rate for third level student training activities and **during 2006, ten days were provided on the Celtic Voyager and two on the Celtic Explorer**. In 2005 a TV crew joined the *Celtic Explorer* to record a “fly- on-the-wall” TV documentary of life onboard a research vessel during a deep-water ROV and acoustic survey for Orange Roughy. The RTE television programme “Nationwide” included a 15-minute feature on the survey in March 2006 helping to raise the profile of Marine Institute’s activities.

12. Research Vessel Performance

Fred Smits (New Zealand – NIWA) reported on a study done by NIWA Vessel Management towards **fuel savings studied and achieved on RV Tangaroa**. Three options for saving fuel were considered: (1) conversion of the Wartsilla engine from running on Marine Diesel (MD) to Light Fuel Oil (LFO); (2) a tender for a 3 year fuel delivery contract; and (3) reducing vessel’s speed.

LFO in New Zealand is a local blend of 70% marine diesel and 30% HFO. To run the vessel on LFO required considerable vessel modifications, such as bunkering and storage facilities, pre-heaters, injectors, filters etc. LFO is less refined fuel with high vanadium and sodium contents, increasing wear on engine, thus increasing maintenance and risk of engine break-down. Furthermore LFO requires high workloads of engine to avoid carbon and soot build-up on valves and in stacks creating a potential fire risk, while LFO cannot be used in Antarctica because of environmental risks. As LFO is a less refined fuel compared to marine diesel there will be an increased pollution, for instance the annual CO₂ emissions will increase from 7,104 to 7,248 tonnes pa, the particulates (“Plume”) will increase from 8.9 to 15.3 tonnes pa and the SO₂ emissions from 0.2 to 48.7 tonnes pa! In spite of the considerable savings (about US\$0.5M pa) **NIWA decided not to run Tangaroa on LFO, mainly for environmental reasons.**

NIWA went through a detailed tendering process and was able to achieve quite considerable cost savings. The main saving however resulted from a reduction in vessel speed. *Tangaroa's* cruising speed is now between 10 and 11 knots (average 10.5 knots) compared to historic 12 knots, while *Kaharoa* now transits at speeds between 8.5 and 10 knots (average 9.5 knots), versus the earlier cruising speed 10.5 knots. **Achieved cost savings in fuel for *Tangaroa* during 2006 was 13.7% and for *Kaharoa* 36.2%.**

Captain Ron Grady (Canada – CCG/DFO) questioned the ISOM members about the **operational costs of research vessels**, particularly as related to annual refits and maintenance costs. Captain Fred Stein advised that the Australian research vessel RV *Southern Surveyor* had an annual maintenance budget of A\$460k, plus A\$200k per year for the three year programmed docking. Marieke Rietveld stated that NIOZ had a fixed R&M budget of Euro320k, plus Euro120K for general maintenance. Per Nieuwejaar reported that the life-cycle cost of the Norwegian research vessel is estimated at three times the vessel's purchase/construction cost or about 5-10% of the vessel value each year. The British Antarctic Survey drydocks its vessels every year. All agreed that the longterm planning for maintenance is critical for the continued safe operation of each nation's research vessel fleet.

John Breslin (Ireland – MI) described a recently introduced post-cruise assessment system, whereby the scientific technical staff on the vessel is requested to complete a form and rate the services from "A" (Excellent) to "E" (Unacceptable). The system is under evaluation at present.

Captain Ron Grady (Canada – CCG/DFO) presented the ISOM members with a **Fleet Performance Management system showing how performance indicators are derived and used on the Canadian Coast Guard fleet**. The CCG Performance Management system contributes to an enhanced priority setting (linking inputs, i.e. resources to outcomes); to a continuously improved service performance; to strengthened accountability; to changes the way the business is perceived (from activity to outcome focussed) and to encourage innovation. The Fleet Performance Indicators included the percentage of actuals achieved versus scheduled for: Actual Service, Vessel Utilisation, Actual Multitasks, Actual Client and CCG Delays, Actual Unplanned Maintenance and Actual Maintenance Ratio. The percentages aimed for is 100% +/- 10%. Also important are the number of Non-Conformity Events, Non-Conformities reported by Employees, Hazardous Incidences and number of Exempted Positions. To-date the performance measures achieved are generally well within the 10% with outliers varying between 81.1 and 116.7%.

13. Submeribles, ROV's and AUV's

Tetsuo Uchida (Japan – JAMSTEC) gave the back-ground and showed pictures of the **joint dive by the JAMSTEC submersible *Shinkai* and the deep water ROV *Hyper Dolphin*** for a Cooperative Science TV Program by the Japanese Broadcasting Corporation and the British Broadcasting Corporation. The selected dive site was a hydrothermal vent of the Hatoma sea knoll close to the Ischigaki Island of Japan. Waterdepth was some 1530m and the temperature of the water escaping from the vent was 200-300°C. The expedition used a Super-HARP HDTV camera with exceptional sharpness.

14. Update on Seabed Mapping and Multibeam Systems.

Hans Petter Knudsen (Norway – IMR) described the development and trials of **the world's first 3D scientific multi-beam echosounder specifically developed to improve biomass estimates for schooling fish**. The SIMRAD MS70 sounder is a joint development between Ifremer in France, the Norwegian Marine Institute in Bergen and Kongsberg SIMRAD in Horten. The MS70 is an omni-directional sonar using a fan of 500 high-resolution acoustic beams distributed over 360 degrees and comprises 800 receivers and 800 transducers. As 3D data is available for each individual ping, the system allows for

combining successive pings into 4D pictures, allowing for a video sequence of the moving fish school in time. The MS70 is fitted in one of the two dropkeels of IMR's research vessel *GO Sors*.

15. Discussions on Crew and Manning Issues

Dave Morris (UK – CEGAS) and John Morrison (Scotland – FRS) initiated a discussion on crewing on research vessels under the European Working Time Directive for Work at Sea. Subsequent to the adoption of the European Working Time Directive for Work at Sea under UK legislation both scientists and crew on FRS vessels can now work a maximum of 13 hours per 24 hour period (with time off for meal breaks). The system seems to be working satisfactorily after some initial problems of the transition from a culture of even longer working hours. The subsequent discussion illustrated that there are still some concerns about fatigue at sea causing human error. However the “six hours on / six hours off” systems seems to work well. Captain Ron Grady (Canada – CCG) reported that the working periods on the Canadian icebreakers are 28 days on / 28 days off, working six on /six off, but that for science vessels these numbers are 42-days on / 42 days off, working six on / six off. Captain Fred Stein (Australia - CSIRO)

16. Items for Next Year's ISOM

The meeting suggested the following topics for the 2007 ISOM in Quindao:

- crewing of research vessels;
- accommodation for science and vessel personnel;
- medical standards;
- life boats and MOB's;
- new-builts;
- “show-and-tell” session

17. Dates and Place of Next Meeting

Prof Xiang Jianhai presented the ISOM members with a most impressive overview of the Institute of Oceanography Chinese Academy of Sciences, Qingdao, China, which include “fly-bys” over the city of Qingdao. All members were warmly invited to participate in the 22nd ISOM which will be organised by IOCAS in October 2007.

Fred Smits (New Zealand – NIWA) offered that ISOM 2008 will be hosted by NIWA and to be held in New Zealand; an offer that was gratefully accepted by the meeting.

18. Adjourn

The Chair expressed many thanks to John Breslin and his staff, particularly Ms Aoife Kelly, for the excellent meeting and the great hospitality and wonderful food extended by the Irish marine Institute during the ISOM 2006 meeting, after which the meeting was adjourned.