

**ESOMM/JIP-2018 Programme**  
**6th International Meeting on**  
**the Effects of Sound in the Ocean on Marine Mammals (ESOMM-2018)**  
**&**  
**3rd Programme Review Meeting of**  
**the IOGP E&P Sound & Marine Life Joint Industry Programme (JIP-PRM)**

**Sunday, 09 September 2018**

*17.00-19.00 Icebreaker and Registration at the Carlton Beach Hotel Scheveningen (Ground Floor), The Hague*

**Monday, 10 September 2018**

**08:00**     *Registration & coffee*

**Opening & Scope of ESOMM/JIP-2018**

**09:00**     Welcome

Opening of ESOMM/JIP-2018 by Commodore (RNLN) Cees Vooijs,  
Deputy-director Defence Joint Information Command, The Netherlands

Cees Vooijs

Introduction & scope of ESOMM/JIP-2018

Frans-Peter Lam

**International Policy & Regulation Developments**

**Chair: Mike Weise**

**09:40**     Overarching issues- cooperation between communities and international developments     René Dekeling

**09:55**     Incidental Take Authorizations: an Overview of the U.S. Marine Mammal Protection Act and Recent NOAA Streamlining Efforts     Jolie Harrison

**10:10**     U.S. Navy Environmental Compliance for At-Sea Training and Testing     Jene Nissen

**10:25**     Discussion

**10:30**     *Coffee*

**International Policy & Regulation Developments continued**

**Chair: René Dekeling**

**11:00**     Cooperation between NATO partners on active sonar and marine life protection     Ron Filipowicz

**11:10**     Overview and update of the Office of Naval Research (ONR) Marine Mammals and Biology (MMB) Programme     Mike Weise

**11:15**     Overview and update of the Living Marine Resources program (LMR)     Anu Kumar

**11:20**     Regulatory Challenges: Looking Beyond our Backyard     Jill Lewandowski

**11:35**     Towards a science-based approach to mitigate impacts from marine seismic surveys     Christine Lamont & Erica Staaterman

**11:50**     Update of Noise Exposure Criteria - a summary     Brandon Southall

**11:55**     Discussion

**12:15**     *Lunch*



Carlton Beach Hotel, The Hague, The Netherlands,  
9-14 September 2018



## JIP overview

Chair: Koen Bröker

13:30	JIP introduction & overview	Gary Isaksen
13:45	Potential use of the JIP research in better regulation of underwater sound	Mark Tasker
13:55	Introduction to BRAHSS project	Jill Lewandowski
14:00	Overview of BRAHSS - Size and scope including experimental design, logistical challenges and lessons learned/ summary results, implications for management, suggestions future research	Doug Cato
14:25	Towards a Risk Assessment Framework/Protocol for Implementing the Data-Driven Population Consequences of (Acoustic) Disturbance (PCAD/PCoD) Model/Approach	Dan Costa
14:50	Discussion	
15:00	<i>Coffee</i>	

## New Developments

Chair: Frans-Peter Lam

15:30	Introduction	Frans-Peter Lam
15:35	International Quiet Ocean Experiment	Peter Tyack
15:45	Acoustic thresholds for marine piling noise in relation to behavioural disturbance of harbour porpoises and seals	Christ de Jong
16:05	Responses of cetaceans to sonar and playback of killer whale sounds	Patrick Miller
16:25	Discussion	
16:45	Closure	
16:45	<i>Reception at Carlton Beach Hotel (Ground Floor OR Beach Club, TBC; closing 19.00)</i>	

**Tuesday, 11 September 2018**

**08:00**     *Coffee*

**JIP Morning Session: Behavioral Responses and Population Consequences of Disturbance**

**Chair: Peter Evans**

<b>08:30</b>	Introduction to JIP projects: behavioral response	Gary Wolinsky
<b>08:40</b>	BRAHSS: Considerations for experimental design of a large-scale behavioral response study	Rebecca Dunlop
<b>08:55</b>	Air gun signal propagation during BRAHSS experiments with humpback whales off Queensland and Western Australia. Studies in the field with seismic air guns	Doug Cato
<b>09:15</b>	BRAHSS: The behavioral responses of migrating humpback whales to air guns: results	Rebecca Dunlop
<b>09:45</b>	BRAHSS: summary of presentations and conclusions	Doug Cato

**10:00**     *Coffee*

<b>10:30</b>	"PCAD4Cod" Impact of seismic survey sound exposure on fishes: population-level modelling and empirical data collection	Hans Slabbekoorn
<b>10:55</b>	Modeling the Population Consequences of Disturbance: Animal Movement to Bioenergetic Models	Dan Costa
<b>11:25</b>	Discussion	

**11:45**     *Lunch*

**Behavioural Response Studies in the field**

**Chair: Peter Tyack**

<b>13:15</b>	Introduction	
<b>13:25</b>	Atlantic Behavioral Response Study: Experimental Design, Analytical Methods, and Preliminary Results	Brandon Southall
<b>13:45</b>	Assessing exposure and response of three species of odontocetes to mid-frequency active sonar (MFAS) during Submarine Command Courses (SCC) at the Pacific Missile Range Facility (PMRF), Hawaii	Robin Baird
<b>14:05</b>	The Sea mammals and Sonar Safety (3S) project – behavioral responses to naval sonar in six species of marine mammals.	Petter Kvadsheim
<b>14:25</b>	Northern bottlenose whales in an acoustically pristine habitat far from naval ranges respond to close and distant exposures of naval sonar	Paul Wensveen
<b>14:45</b>	Discussion	

**15:00**     *Coffee*

**Behavioural Response Studies in the field continued**

**Chair: John Polglaze**

<b>15:30</b>	Baleen whales acoustically derived behaviors with potential responses to US Navy sonar training	Stephen Martin
<b>15:50</b>	Quantifying behavioural responses of minke whales to sonar activity during Navy training exercises.	Catriona Harris
<b>16:10</b>	Behavioral Response of Humpback Whales to US Navy Mid-Frequency Active Sonar	Elizabeth Henderson
<b>16:30</b>	Discussion	
<b>16:55</b>	Closure	

**Wednesday, 12 September 2018**

*Several outdoor activities: beach yoga, boot camp, guided dune walk, starting times 07:15-08:00*

**09:30** Coffee

**JIP morning session: Physical & Physiological Impacts**

**Chair: Mark Tasker**

<b>10:00</b>	Introduction to JIP project: physical and physiological impacts	Kirsty Speirs
<b>10:10</b>	Re-Evaluating Marine Mammal Noise Exposure Criteria: A Decade Following the Southall et al. (2007) Expert Panel	Brandon Southall
<b>10:35</b>	The influence of temporally varying noise from seismic air guns on the detection of underwater sounds by seals	Colleen Reichmuth
<b>10:55</b>	Comprehensive Models of Hearing in Two Species of Mysticetes	Darlene Ketten
<b>11:20</b>	Temporary hearing threshold shift in a harbor porpoise ( <i>Phocoena phocoena</i> ) due to exposure to airgun sounds	Ron Kastelein
<b>11:45</b>	Auditory detection, masking, and temporary threshold shift in bearded seals ( <i>Erignathus barbatus</i> )	Colleen Reichmuth
<b>12:05</b>	Discussion	

**12:30** Lunch

**Behavioural Response Studies in the field continued**

**Chair: Mandy Shoemaker**

<b>13:50</b>	Introduction	
<b>14:00</b>	Methods for collecting large samples of sonar response data on Cuvier's beaked whales	Erin Falcone
<b>14:20</b>	Beaked whale foraging behavior before, during, and after sonar exposure on a Navy test range	Stephanie Watwood
<b>14:40</b>	Foraging in a noisy world: predator-prey interactions under fluctuating noise conditions.	Fleur Visser
<b>15:00</b>	Discussion	

**15:10** Coffee

**Continuous Sound Sources**

**Chair: Petter Kvadsheim**

<b>15:40</b>	Introduction	
<b>15:45</b>	Impact of vibroseismic underwater sound on the behaviour of baleen whales	Joseph Schnitzler
<b>16:05</b>	Sperm whale behaviour responses to pulsed and continuous active sonar: a state based approach to estimate response thresholds and duration	Saana Isojunno
<b>16:25</b>	Modelling the masking potential of naval continuous active sonar (CAS) and conventional pulsed sonar in sperm whales	Sander von Benda-Beckmann
<b>16:45</b>	Discussion	
<b>17:10</b>	Closure	

**Thursday, 13 September 2018**

**08:00**     *Coffee*

**JIP morning session: Monitoring & Mitigation**

**Chair: Olaf Boebel**

**08:30**     Overview of Mitigation & Monitoring     David Hedgeland

**08:45**     BRAHSS: Mitigation application/response to ramp up     Mike Noad

**09:10**     Low Visibility Real-time Monitoring Techniques Review     Ursula Verfuss

**09:30**     The 3-D-V Array: A volumetric, digital towed hydrophone array system capable of bearing and location estimation in 3-D space     Tom Norris

**09:50**     *Coffee*

**10:20**     Evaluation of DECAF Methods Using an Existing Eight-Year Fixed Acoustic Monitoring and Localization Dataset, Deployed During E&P Activities Along the Arctic Continental Shelf.     Len Thomas

**10:40**     AVADECAF: Assessing the ViAbility of Density Estimation for Cetaceans from passive Acoustic Fixed sensors (DECAF) throughout the Life Cycle of an Offshore E&P Field Development     Cormac Booth

**11:00**     Discussion

**11:15**     Optional: PAMGuard demonstration     Doug Gillespie

**11:30**     *Lunch*

**PAM-DCL-Monitoring & Density Estimation**

**Chair: Anu Kumar**

**13:00**     Passive acoustic density estimation: methods evaluation and survey design     Len Thomas

**13:20**     Incorporating Annual Variability of Source Level and Distribution in Large Scale Density Estimation of Fin Whales from a Sparse Array     Jennifer Miksis-Olds

**13:40**     Emissivity rules: Principles of infrared whale detection revisited.     Olaf Boebel

**14:00**     Discussion

**14:30**     *Coffee*

**Population effects**

**Chair: John Harwood**

**15:00**     Understanding the population consequences of disturbance – the PCoD+ project     Enrico Pirotta

**15:20**     Estimating Cuvier's and Blainville's beaked whales' risk of behavioral disturbance from exposure to mid-frequency active sonar     Dave Moretti

**15:40**     Discussion

**Management & Regulation discussion**

**Chair: Jill Lewandowski**

**16:10**     International developments- harmonizing methodology     René Dekeling

**16:20**     Management discussion on future policy challenges related to assessment of population consequences of disturbance by underwater sound

**17:00**     *Closure*

**18:00**     *Departure for Dinner (precise timing to be confirmed)*

**Friday, 14 September 2018**

**08:00**     *Coffee*

**JIP Morning session: Sound Source Characterisation & Propagation**

**Chair: Jen Miksis-Olds & Jason Gedamke**

<b>08:30</b>	Overview of Sound Source Characterisation and Propagation	Mike Jenkerson
<b>08:45</b>	Broadband airgun-source characterisation: the Svein Vaage dataset	Mark Prior
<b>09:05</b>	3-dimensional seismic source characterization study	Natalia Sidorovskaia
<b>09:25</b>	Terminology, measurement, processing and reporting standards for assessing effects of underwater sound on aquatic life	Michael Ainslie
<b>09:45</b>	Acoustic Impacts on Marine Fauna from Marine Vibroseis Technologies	David Zeddies
<b>10:05</b>	Discussion	

**10:30**     *Coffee*

**JIP Closing session**

**Chair: Gary Isaksen**

<b>11:00</b>	IOGP JIP SAML status review	Bob Gisiner
<b>11:30</b>	IOGP JIP SAML future planning	Kirsty Speirs
<b>11:45</b>	Closing comments JIP-PRM meeting	Koen Bröker

**11:55**     *Lunch*

**Standards, Hearing Physiology & Stress Responses**

**Chair: Danielle Kitchen**

<b>13:30</b>	New standards for underwater sound- terminology and audiograms	Michael Ainslie, Dorian Houser, Michele Halvorsen
<b>14:00</b>	Discussion	
<b>14:10</b>	Temporary threshold shift and behavioral response in harbor porpoises due to exposure to 53-C sonar sounds, and TTS studies to derive a high-frequency-cetacean weighting function	Ron Kastelein
<b>14:30</b>	Technical advances in inner ear analysis to assess potential hearing loss and first prediction of cochlear frequency map for harbor porpoise	Maria Morell
<b>14:50</b>	Discussion	

**15:00**     *Coffee*

**Hearing Physiology & Stress Responses continued**

**Chair: Michele Halvorsen**

<b>15:30</b>	Sensitivity and Directionality in the Peripheral Auditory System of Mysticetes	Ted Cranford
<b>15:50</b>	Delphinid stress response to vibratory pile driving noise exposure	Dorian Houser
<b>16:10</b>	Baleen whales divulge a physiological response to 150 years of global anthropogenic stressors	Stephen Trumble
<b>16:30</b>	Discussion	
<b>16:40</b>	Closing of plenary programme of ESOMM/JIP-2018	
<b>17:00</b>	<i>The End</i>	

Posters (first authors, alphabetical order)

On display Monday to Friday

1	A whale's dilemma; considering transboundary disparities of regulating impact to marine mammals from sound associated with offshore energy development	Tamara Arzt
2	Impact of mid-frequency active sonar on beaked whale echolocation from long-term passive acoustic recordings	Simone Baumann-Pickering
3	Humpback whales ( <i>Megaptera novaeangliae</i> ) can discriminate between the sounds of different killer whales ( <i>Orcinus orca</i> ) ecotypes	Benjamin Benti
4	Broad-Scale Acoustic Monitoring For Cetaceans And Underwater Noise In Relation To Offshore Wind Farm Construction In Scotland	Ross Culloch
5	PAMGuard demo	Douglas Gillespie
6	The Ecology of Human Sound Sources: Where They Live, Their Habits, and Why They Do What They Do	Bob Gisiner
7	Assessing risk from impact pile driving using the damped cylindrical spreading model	Michele Halvorsen
8	A need for standardization of evoked potential hearing test methods in odontocetes	Dorian Houser
9	Effects of anthropogenic noise on spatial avoidance and foraging behavior in harbour porpoise	Annebelte Kok
10	Soundscapes, Passive Acoustic Monitoring (PAM), and Ecosystem Level Effects: A Discussion of Some of the Temporal Issues needed to Bridge the Analysis Gap	Stanley Labak
11	Automatic Localization of Sperm Whales and Sei Whales during Marine Seismic Survey	Christophe l'Her
12	Geophysical surveys – some challenges when advising on risk assessment and mitigation	Sonia Mendes
13	Hazard zones for potential auditory damage – Estimated cumulative effects of pile driving for harbour porpoises in the German North Sea	Tobias Schaffeld
14	Spatial, spectral and temporal distribution of sound for selected sound sources in the Dutch North Sea	Ozkan Sertlek
15	Polar Winter Research Expeditions to the Singer-songwriters of the Arctic sea ice: Spitsbergen's remnant Bowhead whale population	Herman Sips
16	A Risk Assessment Framework to Evaluate the Potential Relative Effects of Noise on Marine Mammals	Brandon Southall
17	The effectiveness of computationally modeling mysticete hearing thresholds	Andrew Tubelli
18	The International Quiet Ocean Experiment	Peter Tyack
19	Underwater noise in practice; Seismic surveys in the North Sea	Audrey van Mastrigt
20	Modelling sound and disturbance maps using the impulsive noise register for assessing cumulative impact of impulsive sound	Sander von Benda-Beckmann
21	Modelling the effect of air gun array noise on marine mammal communication	Benno Woelfing
22	Predicting cochlear frequency response using mechanical properties of the basilar membrane	Aleks Zosuls