Incorporating iSCSS inec 2018 14th International Naval Engineering Conference and Exhibition | Principal Sponsor L3 MAPPS

CONFERENCE PROGRAMME (subject to amendment)

Tuesday 2 October 2018

0800 – 0900 Registration and coffee

OPENING PLENARY SESSION | Main Auditorium

0900 – 0915 **Introduction** | ***Capt Matt Bolton RN,*** *Chairman, INEC 2018*

0915 – 0930 **Welcome Address**
Professor Sir Jim McDonald, *Principal and Vice Chancellor, University of Strathclyde, UK*

0930 – 1100 **Keynote Addresses**
Rangesh Kasturi, *President, L3 MAPPS;* ***Rear Admiral Paul Methven,*** *Director Submarine Acquisition, Royal Navy;* ***Commodore Peter Knipping MBE RNLN,*** *Chief Naval Engineering Officer, Royal Netherlands Navy*

1100 – 1130 Coffee

Chair: ***Cdr Rinze Geertsma RNLN, Chairman, iSCSS 2018***

1130 – 1200 **Combined seapower: A combat power perspective**
G H Sturtevant, *United States Department of Navy, USA;* ***Dr I Whitelegg,*** *Rolls-Royce, UK;* ***J M Voth, A M Lowe,*** *Herren Associates, Inc., USA*

1200 – 1230 **Standing on the shoulders of giants: How the maritime industry can leverage developments in autonomy from other domains**
Dr C L Benson, *Delft University of Technology/United States Air Force Office of Scientific Research/Massachusetts Institute of Technology, The Netherlands/USA;* ***P D Sumanth, Ir A P Colling,*** *Delft University of Technology, The Netherlands (Sir Donald Gosling Award Candidates)*

1230 – 1300 **Defence youth STEM outreach – inspiring the next generation**
Capt M F Rose RN, Capt D Joyce RN, *Ministry of Defence, UK*

1300 – 1315 **Discussion**

1315 – 1430 **Lunch**

AFTERNOON PARALLEL SESSIONS

INEC | Submarines
Main Auditorium A, Level 2
Chair: Tim Hardy, BMT

1430 – 1500 **More than a mission – modelling the impact of a support solution on submarine availability, cost and safety**
R J C MacMillan, S K Crawford, *Babcock International Group, UK (Sir Donald Gosling Award Candidates)*

INEC | Systems engineering
Main Auditorium B, Level 3
Chair: Peter Deverill, Ministry of Defence, UK

The physical integration of a significant marine engineering package into the T23 Frigate
D G Dobbins, *Naval Design Partnering, UK (Sir Donald Gosling Award Candidate)*

INEC | Waste heat recovery
Main Auditorium C, Level 3
Chair: Phil Crago, Babcock International Group

Effect of Gas-To-Liquid (GTL) fuels on marine diesel engines compared to F-76
Lt R S Tol RNLN, *Netherlands Defence Academy, The Netherlands;* ***Lt Cdr Y Linden RNLN,*** *Defence Materiel Organisation, The Netherlands (Sir Donald Gosling Award Candidates)*

iSCSS | Power systems
Level 1 Auditorium, Level 1
Chair: Jeffrey Cohen, US Navy Surface Warfare Center

The expanding role of Variable Frequency Drives in naval automation
W A Johnson, *Rockwell Automation, USA*

iSCSS | Exploitation of marine robotic systems
Conference rooms 6&7, Level 3
Chair: Andrea Munafò, National Oceanography Centre

WAVE module for hybrid oceanographic autonomous underwater vehicle – prototype experimental validation and characterisation
Prof A Caiti, Dr R Costanzi, Dr D Fenucci, *Università di Pisa/Interuniversity Center of Integrated Systems for the Marine Environment (ISME), Italy;* ***V Manzari,*** *Università di Pisa/Naval Experimentation and Support Centre of Italian Navy (CSSN), Italy;* ***Dr A Caffaz,*** *GraalTech s.r.l., Italy;* ***M Stifani,*** *Naval Experimentation and Support Centre of Italian Navy (CSSN), Italy*

AFTERNOON PARALLEL SESSIONS

INEC | Submarines
Main Auditorium A, Level 2
Chair: Tim Hardy, BMT

INEC | Systems engineering
Main Auditorium B, Level 3
Chair: Peter Deverill, Ministry of Defence, UK

INEC | Waste heat recovery
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Level 1 Auditorium, Level 1
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iSCSS | Exploitation of marine robotic systems
Conference rooms 6&7, Level 3
Chair: Andrea Munafó, National Oceanography Centre

1500 – 1530

SUPREME: Submarine space partitioning in Rhino by Quaestor3
Dr M van Hees, *Maritime Research Institute Netherlands (MARIN), The Netherlands;* ***W H van den Broek-de Bruijn,*** *Defence Materiel Organisation, The Netherlands*

From automation to autonomy – designing a complete ship control system
C J Field, *Rolls-Royce, UK*
(Sir Donald Gosling Award Candidate)

Charge air configurations for propulsion diesel engines aboard fast naval combatants
J Q Rusman, *Delft University of Technology, The Netherlands*
(Sir Donald Gosling Award Candidate)

The role of future information in control system design for shipboard power systems
Dr D F Opila, Cdr J D Stevens USN, *US Naval Academy, USA;* ***Dr A M Cramer,*** *University of Kentucky, USA*

U-SWATH: An innovative USV design towards the extended ship
G Bruzzone, A Odetti, M Caccia, Dr M Bibuli, C Lugni, *National Research Council INM, Italy;* ***E F Campana,*** *National Research Council DIITET, Italy*

1530 – 1600

The influence of the facility nuclear safety case on the design of naval refit support equipment
H K Cole, *Babcock International Group, UK*
(Sir Donald Gosling Award Candidate)

Systems engineering – the hard way
A R Edmondson, *BAE Systems Maritime - Submarines, UK;* ***B Twomey,*** *Rolls-Royce, UK*

Evaluation of electric-turbo-charging applied to marine diesel-engines
Prof R Bucknall, Dr S Suárez de la Fuente, *University College London, UK;* ***Dr S Szymko, W Bowers,*** *Bowman Power Group Ltd, UK;* ***A Sim,*** *Rolls-Royce, UK*

Deriving specifications for coupling through dual-wound generators
Dr L J Rashkin, Dr J C Neely, Dr D G Wilson, Dr S F Glover, *Sandia National Laboratories, USA;* ***Dr N Doerry,*** *NAVSEA, USA;* ***Dr T J McCoy,*** *McCoy Consulting, LLC, USA*

OCEANIDS: Building next generation maritime autonomous systems
M Furlong, R Marlow, S McPhail, A Munafó, M Pebody, A Phillips, D Roper, G Salavasidis, *National Oceanography Centre, UK*

1600 – 1615 **Discussion**

1615 – 1645 **Tea**

AFTERNOON PARALLEL SESSIONS

INEC | Applied mechanics
Main Auditorium A, Level 2
Chair: Prof Catriona Savage, University College London

INEC | Enhanced and autonomous navigation
Main Auditorium B, Level 3
Chair: Bernard Twomey, Rolls-Royce

INEC | Electric weapon system integration
Main Auditorium C, Level 3
Chair: Glen Sturtevant, US Department of Navy

iSCSS | Engine control
Level 1 Auditorium, Level 1
Chair: Rear Adml ME (ret) Klaas Visser, Delft University of Technology

iSCSS | Exploitation of marine robotic systems
Conference rooms 6&7, Level 3
Chair: Angelo Odetti, National Research Council INM

1645 – 1715

A practical ultrasonic inspection method for detecting and characterising defects found within composite repairs
J Downing, A Hook, *Babcock International Group, UK*

When will autonomous ships arrive? A technological forecasting perspective
Dr C L Benson, *Delft University of Technology/United States Air Force Office of Scientific Research/ Massachusetts Institute of Technology, The Netherlands/USA;* ***Ir C Kooij, Ir A P Colling,*** *Delft University of Technology, The Netherlands*
(Sir Donald Gosling Award Candidates)

The Advanced Technology Corvette-Railgun (ATK-R) design study – future weapons and small ship power systems
Dr R J Pawling, L Farrier, Prof R Bucknall, *University College London, UK*

Robustness analysis of the next generation of EGR controllers in marine two-stroke diesel engines
X Llamas, Prof L Eriksson, *Linköping University, Sweden*

An advanced guidance & control system for an unmanned vessel with azimuthal thrusters
Dr M Bibuli, Ga Bruzzone, Gi Bruzzone, M Caccia, G Camporeale, D Chiarella, R Ferretti, M Giacopelli, A Odetti, A Ranieri, E Spirandelli, E Zereik, *National Research Council of Italy, Italy*

1715 – 1745

Remedial solutions to control excessive propeller induced hull vibrations on a landing craft
Prof M Fan, *Abu Dhabi Ship Building, UAE;* ***Dr B Aktas, Dr W Shi, Dr N Sasaki, P Fitzsimmons, Dr M Atlar,*** *University of Strathclyde, UK*

Enhanced navigation at sea: An augmented reality-based tool for bridge operators
Dr M Martelli, Prof M Figari, *Polytechnic School of Genoa University, Italy;* ***M di Summa, G P Viganò, M Sacco,*** *Institute of Automation and Industrial Technologies, (CNR-ITIA), Italy;* ***P Cassarà, A Gotta,*** *National Research Council, Institute of Science and Information Technologies, (CNR-ISTI), Italy;* ***L Sebastiani,*** *Seastema s.p.a, Italy;* ***P Guglia, G Delucchi,*** *Fincantieri s.p.a, Italy*

Informing the power system performance envelope for pulse load operation
K Mills, *Rolls-Royce Naval Electrical Automation and Control, UK;* ***J Xiong, P Venkatesh,*** *Rolls-Royce@NTU Corporate Lab, Singapore;* ***Dr X Liu,*** *Rolls-Royce Electrical, Singapore*
(Sir Donald Gosling Award Candidates)

Micro-pilot-induced ignition diesel/natural gas engine control system development and engine performance/emission optimization
G Zhao, *Harbin Engineering University, China*
(Sir Donald Gosling Award Candidate)

An acoustic-based approach for real-time deep-water navigation of an AUV
A Tesei, M Micheli, A Vermeij, G Ferri, M Mazzi, G Grenon, L Morlando, *NATO STO CMRE, Italy;* ***R Costanzi, D Fenucci, A Caiti,*** *Università di Pisa, Italy;* ***A Munafó,*** *National Oceanographic Centre, UK*

AFTERNOON PARALLEL SESSIONS	INEC | Applied mechanics Main Auditorium A, Level 2 *Chair: Prof Catriona Savage, University College London*	INEC | Enhanced and autonomous navigation Main Auditorium B, Level 3 *Chair: Bernard Twomey, Rolls-Royce*	INEC | Electric weapon system integration Main Auditorium C, Level 3 *Chair: Glen Sturtevant, US Department of Navy*	iSCSS | Engine control Level 1 Auditorium, Level 1 *Chair: Rear Adml ME (ret) Klaas Visser, Delft University of Technology*	iSCSS | Exploitation of marine robotic systems Conference rooms 6&7, Level 3 *Chair: Angelo Odetti, National Research Council INM*
1745 – 1815	**FAUSST – bridging the gap between steel and fibre reinforced materials** ***Dr L Molter,*** *Center of Maritime Technologies e.V., Germany*	**Is there a case for emulating a fish or other sea borne creatures for propulsion of underwater vehicles?** ***Cdre (Dr) R K Rana,*** *Independent Consultant, India;* ***N Johnson, P Dongare, Prof S Barve,*** *Savitribai Phule Pune University, India*	**Energy storage design considerations for an MVDC power system** ***Dr L J Rashkin, Dr J C Neely, Dr D G Wilson, Dr S F Glover,*** *Sandia National Laboratories, USA;* ***Dr N Doerry, S Markle,*** *NAVSEA, USA;* ***Dr T J McCoy,*** *McCoy Consulting, LLC, USA*	**Ships diesel engine performance modelling with combined physical and machine learning approach** ***Dr A Coraddu,*** *University of Strathclyde, UK;* ***Ir M Kalikatzarakis, Ir G J Meijn,*** *Damen Schelde Naval Shipbuilding, The Netherlands;* ***Dr L Oneto,*** *University of Genoa, Italy;* ***Lt Cdr (E) Ir R D Geertsma RNLN, Dr M Godjevac,*** *Delft University of Technology, The Netherlands*	
1815 – 1830	**Discussion**				
1830 – 2000	**Welcome Reception |** ***INEC/iSCSS 2018 Exhibition area***				

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Wednesday 3 October 2018

0800 – 0900 Registration and coffee

MORNING PARALLEL SESSIONS

INEC | Standards
Main Auditorium A, Level 2
Chair: Jens Ballé, thyssenkrupp Marine Systems GmbH

0900 – 0930

International Naval Safety Association – the first 10 years
N Overfield, *Chair, INSA Steering Committee, UK;* ***J McKay,*** *INSA Secretariat, Lloyd's Register, UK*

0930 – 1000

Selection of standards in naval programmes: Harmonising classification rules with commercial and military standards
G G Salas-Berrocal, C Marrugo-Puerta, *COTECMAR, Colombia*
(Sir Donald Gosling Award Candidates)

1000 – 1030

Efficient procurement of low vulnerability warships
J S Schofield, D J Wright, *Survivability Consulting Limited, UK*

1030 – 1045 Discussion

1045 – 1115 Coffee

INEC | Damage control and survivability part 1
Main Auditorium B, Level 3
Chair: Cdre Peter Knipping RNLN

0900 – 0930

Machinery space fire fighting – modern alternatives
T Goode, *Babcock International Group, UK*
(Sir Donald Gosling Award Candidate)

0930 – 1000

Royal Canadian Navy – fighting the internal battle with a battle damage control system and embedded kill cards
M Nottegar, T Gauthier, *Naval Engineering Test Establishment, Canada;* ***S Pakianathan,*** *Department of National Defence, Canada;* ***Y Lamontagne,*** *L3 MAPPS, Canada*

1000 – 1030

COSIMAR: Continuous Operational Signature Monitoring Awareness and Recommendation
Dr J A A J Janssen, *TNO, The Netherlands;* ***H Hasenpflug, M Janssen,*** *CSSM, Germany*

INEC | Energy storage
Main Auditorium C, Level 3
Chair: Benjamin Thorp, Rolls-Royce

0900 – 0930

Investigating the faulted performance of warship power systems with integrated energy storage
L Farrier, *University College London, UK*
(Sir Donald Gosling Award Candidate)

0930 – 1000

Active control of a hybrid energy storage module (HESM) driving transient loads
I J Cohen, Dr D A Wetz, *University of Texas at Arlington (UTA), USA;* ***J M Heinzel,*** *Naval Surface Warfare Center, USA*

1000 – 1030

Battery & ultra-capacitor based energy storage vessel integration, capabilities, considerations and challenges
M Southall, K Ganti, *GE Power Conversion, UK*

iSCSS | System identification and simulation
Level 1 Auditorium, Level 1
Chair: Dr Michele Martelli, University of Genoa

0900 – 0930

Energy efficient propulsion system for dynamic positioning application: Design and assessment
Dr A Coraddu, K Chu, *University of Strathclyde, UK;* ***Dr S Donnarumma, Prof M Figari,*** *University of Genoa, Italy*

0930 – 1000

Fingerprinting the ship propulsion system: Low hanging fruit or mission impossible?
Dr A Vrijdag, Y Sang, *Delft University of Technology, The Netherlands*

1000 – 1030

Submarine autopilot performance optimization with system identification
Dr F Belanger, Dr X Cyril, *L3 MAPPS, Canada;* ***D Millan,*** *National Research Council, Canada*

Interactive sessions | 0900 - 1415
Power and propulsion
Foyer, Level 3

Chairs: ***Oliver Simmonds, BMT / Prof Dr Ir R G van de Ketterij, Royal Netherlands Naval Academy***

Torsional Vibration Analysis by bondgraph modelling – a practical approach
Ing T Heeringa, *Heeringa Engineering, The Netherlands*

Optimising technique in matching combined diesel engine or gas turbine (CODOG) propulsion system to hull and propeller of a frigate
Prof K D H Bob-Manuel, B O Okim, *Rivers State University, Nigeria*

Study on intelligent speed control algorithm for diesel engine
Dr E Song, C Ma, G Zhao, Dr C Yao, *Harbin Engineering University, China*

MORNING PARALLEL SESSIONS	INEC | Aviation integration Main Auditorium A, Level 2 *Chair: Simon Knight FREng, Babcock International Group*	INEC | Damage control and survivability part 2 Main Auditorium B, Level 3 *Chair: Cdre Peter Knipping RNLN*	INEC | Real time control of power systems Main Auditorium C, Level 3 *Chair: Roger Tooke, Rolls-Royce*	iSCSS | Safety Level 1 Auditorium, Level 1 *Chair: Suthakar Pakianathan, Department of National Defence, Canada*
1115 – 1145	**The role of modelling and simulation in the preparations for flight trials aboard the Queen Elizabeth Class Aircraft Carriers** ***Dr M F Kelly, N A Watson, Dr M D White, Prof I Owen,*** *University of Liverpool, UK;* ***Dr S J Hodge,*** *BAE Systems, UK*	**Towards a novel design perspective for system vulnerability using a Markov chain** ***Ir A C Habben Jansen, Dr A A Kana,*** *Delft University of Technology, The Netherlands;* ***Dr Ir E A E Duchateau,*** *Defence Materiel Organisation, The Netherlands* *(Sir Donald Gosling Award Candidates)*	**T26 PMS – real time control of power generation, propulsion & auxiliaries** ***W Miners, H Arikkat,*** *L3 MAPPS UK, UK* *(Sir Donald Gosling Award Candidates)*	**Lessons learnt from IEC61508 software assessments** ***R H Campbell, C Allsopp, R M Phillips,*** *Frazer-Nash Consultancy, UK* *(Sir Donald Gosling Award Candidates)*
1145 – 1215	**Superstructure aerodynamics of the Type 26 Global Combat Ship** ***R Mateer, Dr S A Scott, Prof I Owen, Dr M D White,*** *University of Liverpool, UK*	**Impact of flinch technology on damage control and survivability** ***D Berenbaum, Dr R Sahie-Pour,*** *L3 MAPPS UK, UK*	**Optimal control and real-time simulation of hybrid marine power plants** ***Dr T Q Dinh, T M N Bui, J Marco,*** *Warwick Manufacturing Group (WMG), UK;* ***Dr C Watts,*** *Babcock International Group, UK*	**Three laws good: Technology is a dangerous master** ***Dr M J Cook, T Simpson, E Garrett, M Thody,*** *BAE Systems (Maritime), UK*
1215 – 1245	**De-risking flight trials using airwake simulations** ***Dr C M Ward,*** *Frazer-Nash Consultancy, UK* *(Sir Donald Gosling Award Candidate)*	**Network-based metrics for assessment of naval distributed system architectures** ***G Paparistodimou, A Duffy, P Knight, I Whitfield,*** *University of Strathclyde, UK;* ***M Robb, C Voong,*** *BAE Systems Maritime - Naval Ships, UK*	**Application of machine learning and mathematical programming in the optimization of the energy management system for hybrid-electric vessels having cyclic operations** ***N Mohammadzadeh,*** *Politecnino di Milano, Italy;* ***Dr F Baldi,*** *École Polytechnique Fédérale de Lausanne (EPFL), Switzerland;* ***E J Boonen,*** *DAMEN Shipyard, The Netherlands* ***Presented by Dr A Coraddu,*** University of Strathclyde, UK	**Shipping safety into the naval industry** ***A Labonté Jones, N Lerigo-Smith,*** *L3 MAPPS UK, UK*
1245 – 1300	**Discussion**			
1300 – 1415	**Lunch**			

AFTERNOON PARALLEL SESSIONS	INEC | Support part 1 Main Auditorium A, Level 2 *Chair: John Forbes, BAE Systems Maritime – Naval Ships*	INEC | Ship design: Safety and environmental Main Auditorium B, Level 3 *Chair: Rob Skarda, Steller Systems*	INEC | Energy management Main Auditorium C, Level 3 *Chair: Prof Campbell Booth, University of Strathclyde*	iSCSS | Navigation Level 1 Auditorium, Level 1 *Chair: Prof Carlos Guedes Soares, CENTEC, Portugal*
1415 – 1445	**Low-pressure cold metal spray coatings for repair and protection of marine components** ***M Pal,*** *BAE Systems Maritime Services, UK*	**Environmental modelling and simulation for naval ships** ***Y Abbas,*** *Babcock International Group, UK*	**Extended heterogeneous controller hardware-in-the-loop testbed for evaluating distributed controls** ***Dr K Schoder, Dr M Stanovich, Dr T Vu, Prof C S Edrington, Dr M Steurer,*** *Florida State University, USA*	**A random sampling based algorithm for ship path planning with obstacles** ***Dr R Zaccone, Dr M Martelli,*** *Polytechnic School of Genoa University, Italy* *(Sir Donald Gosling Award Candidates)*
1445 – 1515	**Condition based data trending to optimise maintenance on Sandown class propulsion system** ***P Richardson,*** *Babcock International Group, UK*	**The high capacity expanding lifeboat HiCEL – meeting the modern SAR challenge** ***J R E Wright,*** *Ministry of Defence, UK;* ***G E Payne,*** *Steller Systems Ltd, UK* *(Sir Donald Gosling Award Candidates)*	**New developments in energy management – battery lifetime incorporation and power consumption forecasting** ***D Mitropoulou,*** *RH Marine Netherlands BV, The Netherlands;* ***L Elling,*** *Netherlands Defence Academy/University of Bath, The Netherlands/UK* *(Sir Donald Gosling Award Candidates)*	**Assessment of wind heeling lever determined through CFD against the current naval stability standards** ***J N Alderton,*** *QinetiQ, UK* *(Sir Donald Gosling Award Candidate)*
1515 – 1545	**Automatic 3D design tool for fitted spools in shipbuilding industry** ***F Uzcategui,*** *UMI UDC-Navantia, Spain;* ***J Vilar, A Brage, Dr H Moro,*** *Navantia, Spain;* ***Dr A Paz-Lopez,*** *Mytech IA, Spain;* ***A Mallo, Dr F Bellas,*** *University of Coruña, Spain*	**Effective safety management – the tale of the engineer, safety manager and accountant** ***Dr A Franks, P J James,*** *Lloyd's Register EMEA, UK*	**Effects of varying ramp rate and amount of ES** ***D Gonsoulin, G Ozkhan, B Papari, Prof C S Edrington,*** *Florida State University, USA*	**Manoeuvring automation towards autonomous shipping** ***Dr Ing A U Schubert, Dr Ing M Gluch, Prof Dr Ing O Simanski,*** *University of Applied Sciences Wismar, Germany;* ***Dipl Ing M Kurowski, Prof Dr Ing T Jeinsch,*** *University of Rostock, Germany*
1545 – 1600	**Discussion**			
1600 – 1630	**Tea**			

AFTERNOON PARALLEL SESSIONS	INEC | Support part 2 Main Auditorium A, Level 2 *Chair: John Forbes, BAE Systems Maritime – Naval Ships*	INEC | Safety Main Auditorium B, Level 3 *Chair: Keith Howard, Babcock International Group*	iSCSS | Human factors Level 1 Auditorium, Level 1 *Chair: Lt Cdr Frans Geertsma RNLN, Defence Materiel Organisation*
1630 – 1700	**An introduction to the Babcock designed super-dock blocks** ***G Kerr, N Georgantzi,*** *Babcock International Group, UK*	**"Having a blast" – assessment of compartment overpressure following an arc fault** ***A Lane,*** *BAE Systems Maritime Services, UK;* ***P Worthington, Dr I Thompson, W Galloway, G Stark,*** *BAE Systems Naval Ships, UK*	**Enabling lean manning through automation** ***J Chilcott, N Kennedy,*** *L3 MAPPS UK, UK*

AFTERNOON PARALLEL SESSIONS	INEC | Support part 2 Main Auditorium A, Level 2 *Chair: John Forbes, BAE Systems Maritime – Naval Ships*	INEC | Safety Main Auditorium B, Level 3 *Chair: Keith Howard, Babcock International Group*	iSCSS | Human factors Level 1 Auditorium, Level 1 *Chair: Lt Cdr Frans Geertsma RNLN, Defence Materiel Organisation*
1700 – 1730	**Waterfront partnership – integration and cooperation in submarine repair** ***Cdr A Bagga RCN,*** *FMF Cape Breton, Canada;* ***T J Dupuis,*** *Seaspan Victoria Shipyards Ltd, Canada*	**Play it again Sam: Recurrent themes in interface development in safety critical systems for underwater platforms** ***Dr M J Cook, Dr S Bury, T Simpson, M Thody, D Garrett,*** *BAE Systems Submarines, UK*	**Lighting future naval ships – mission optimized and human centric** ***Dr G G Langer,*** *thyssenkrupp Marine Systems GmbH, Germany;* ***N T Launert,*** *LINKSrechts GmbH, Germany*
1730 – 1800	**Discussion**		
1830	**Transportation to The Riverside Museum**		
1900 – 2100	**Conference Reception, The Riverside Museum**		

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Thursday 4 October 2018

0800 – 0900 Registration and coffee

MORNING PARALLEL SESSIONS	INEC | Digital transformation part 1 Main Auditorium A, Level 2 *Chair: Ian Grant, QinetiQ*	INEC | Electric and hybrid Main Auditorium B, Level 3 *Chair: Oliver Simmonds, BMT*	INEC | Environmental compliance Main Auditorium C, Level 3 *Chair: Lt Amy Bolland RN, Ministry of Defence, UK*	iSCSS | Power conversion Level 1 Auditorium, Level 1 *Chair: Dr David Wetz Jr, University of Texas*
0900 – 0930	**Enabling, equipping and empowering the support enterprise through digital transformation** ***S N Waterworth, Lt Cdr R J McClurg RN, Capt M T W Bolton RN,*** *Ministry of Defence, UK*	**General purpose frigate low-speed electric drive – when does it make sense?** ***S M Newman, O J Simmonds,*** *BMT Defence & Security Ltd, UK*	**Instead of simply asking "what?", naval engineers need to ask "why?": Environmental compliance challenges and relevance in warship design** ***J F Polglaze,*** *PGM Environment, Australia*	**Sequence based control for electro-thermal management of next generation integrated power systems** ***Dr T V Vu,*** *Clarkson University, USA;* ***Dr F Diaz,*** *Corhuila University Corporation of Huila, USA;* ***Prof C S Edrington,*** *Florida State University, USA*
0930 – 1000	**Turning data into reality** ***S Leinster-Evans,*** *BAE Systems, UK;* ***S Luck,*** *BMT, UK;* ***J Newell MBE,*** *Juno Fleet Services Ltd, UK*	**Towards the holy grail? A novel power dense, low noise permanent magnet motor** ***B Salter, C Lewis,*** *GE Power Conversion, UK*	**Marine dual fuel engine control system modelling and safety implications analysis** ***Dr G Theotokatos, S Stoumpos, V Bolbot, E Boulougouris, Prof D Vassalos,*** *University of Strathclyde, UK*	**Fast coordination of power electronic converters for energy routing in shipboard power systems** ***Dr H L Ginn III, J D Bakos, A Benigni,*** *University of South Carolina, USA*
1000 – 1030		**Naval hybrid power take-off and power take-in – lessons learnt and future advances** ***Dr M Benatmane, B Salter,*** *GE Power Conversion, UK*	**Emissions reduction at The Netherlands Ministry of Defence: Potential, possibilities and impact** ***Prof Dr Ir R G van de Ketterij,*** *Netherlands Defence Academy, The Netherlands*	**Exergy analysis of ship power systems** ***Prof G G Parker, E H Trinklein, R D Robinett III,*** *Michigan Technological University, USA;* ***Dr T J McCoy,*** *McCoy Consulting LLC, USA*
1030 – 1045	**Discussion**			
1045 – 1115	**Coffee**			

MORNING PARALLEL SESSIONS	INEC | Digital transformation part 2 Main Auditorium A, Level 2 *Chair: Ian Grant, QinetiQ*	INEC | UXV Main Auditorium B, Level 3 *Chair: Frank Mungo, Egeria Consulting Ltd*	INEC | QEC Class Main Auditorium C, Level 3 *Chair: Lt Cdr Alex Davies RN, Ministry of Defence, UK*	iSCSS | Human factors Level 1 Auditorium, Level 1 *Chair: Toby Drywood, BMT*
1115 – 1145	**An investigation into contracted loaded tip propellers using Computational Fluid Dynamics (CFD)** ***N R J Williams,*** *Southampton University, UK* *(Sir Donald Gosling Award Candidate)*	**Securing interoperable and integrated command and control of unmanned systems – building on the successes of Unmanned Warrior** ***Dr P Smith,*** *Dstl, UK;* ***W Biggs,*** *QinetiQ, UK*	**Capable, adaptable, flexible: The design of a cost-effective naval platform with focus on the increasing use of off-board assets** ***R Irvine,*** *Babcock International Group, UK*	**QEC IPMS the technical challenge** ***J K McKelvie, P Lakey,*** *L3 MAPPS UK, UK*

MORNING PARALLEL SESSIONS	INEC | Digital transformation part 2 Main Auditorium A, Level 2 *Chair: Ian Grant, QinetiQ*	INEC | UXV Main Auditorium B, Level 3 *Chair: Frank Mungo, Egeria Consulting Ltd*	INEC | QEC Class Main Auditorium C, Level 3 *Chair: Lt Cdr Alex Davies RN, Ministry of Defence, UK*	iSCSS | Human factors Level 1 Auditorium, Level 1 *Chair: Toby Drywood, BMT*
1145 – 1215	**Digitally empowering naval fleet support** ***C Rowley, Dr G Ford,*** *Babcock International Group, UK*	**JIP LAURA, ensuring future flexible off board capability in todays and tomorrows surface combatants** ***Dr M Robb, D Lewis, A Burgess,*** *BAE Systems Maritime - Naval Ships, UK;* ***D Smith,*** *Naval Design Partnering Team, UK;* ***Ir E H Takken,*** *Defence Materiel Organisation, The Netherlands;* ***Dr Ing F G J Kremer,*** *Maritime Research Institute Netherlands (MARIN), The Netherlands*	**HMS Queen Elizabeth Aircraft Carrier: The challenges and successes of commissioning, trialling and delivering an integrated full electric power and propulsion system** ***P A Eaton,*** *GE Power Conversion, UK;* ***D Webster,*** *Thales, UK*	**No process for initiative** ***CPO G J Parkes,*** *1710 Naval Air Squadron, Royal Navy, UK*
1215 – 1245	**Digital – benefits for naval platforms** ***D R Chaderton,*** *GE Power Conversion, UK*	**Generational shift: How technology is shaping a step change in the future of mine counter-measures** ***J C Rigby, J Johnson,*** *BMT, UK;* ***J McWilliams,*** *QinetiQ, UK*	**Learning lessons to de-risk future complex projects: Design and integration of the world's largest ship platform management system Queen Elizabeth Class Aircraft Carriers** ***M Williams,*** *Thales, UK*	**Button it: Managing human factors requirement more effectively in expressed designs** ***Dr M J Cook, T Simpson,*** *BAE Systems Submarines, UK*
1245 – 1300	**Discussion**			
1300 – 1415	**Lunch**			

CLOSING PLENARY SESSION | SHIP DESIGN FUTURE CONCEPTS | Main Auditorium

Chair: ***Cdr Rinze Geertsma RNLN, Chairman, iSCSS 2018***

1415 – 1445	**Nonlinear power flow control design methodology for navy electric ship microgrid energy storage requirements** ***Dr D G Wilson, Dr S F Glover, M A Cook,*** *Sandia National Laboratories, USA;* ***Dr W W Weaver, Dr R D Robinett III,*** *Michigan Technological University, USA;* ***J Young,*** *OptimoJoe, LLC, USA;* ***S Markle,*** *NAVSEA, USA;* ***Dr T J McCoy,*** *McCoy Consulting, LLC, USA*
1445 – 1515	**Integration of battle damage repair management in an Integrated Mission Management System** ***Lt Cdr F D Geertsma RNLN,*** *Defence Materiel Organisation, The Netherlands*
1515 – 1545	**Combat safety and survivability – Combining survivability and safety techniques to address crew safety in combat** ***D Manley,*** *Ministry of Defence, UK*
1545 – 1600	**Discussion**
1600 – 1615	**Closing Summary |** ***Rear Admiral Nigel Guild CB FREng***
1615 – 1625	**Presentation of the Sir Donald Gosling Award**
1625 – 1630	**Closing Remarks |** ***Capt Matt Bolton RN,*** *Chairman, INEC 2018*
1630	**Close of Conference**