

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

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

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

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

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

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)

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)

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)

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

WAVE module for hybrid oceanographic autonomous underwater vehicle – prototype experimental validation and characterisation
Prof A Caiati, 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
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iSCSS | Power systems

Level 1 Auditorium, Level 1
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Warfare Center

**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 Adm 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 Giacomelli, 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
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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

Wednesday 3 October 2018

0800 – 0900 Registration and coffee

MORNING PARALLEL SESSIONS	INEC Standards Main Auditorium A, Level 2 <i>Chair: Jens Ballé, thyssenkrupp Marine Systems GmbH</i>	INEC Damage control and survivability part 1 Main Auditorium B, Level 3 <i>Chair: Cdre Peter Knipping RNLN</i>	INEC Energy storage Main Auditorium C, Level 3 <i>Chair: Benjamin Thorp, Rolls-Royce</i>	iSCSS System identification and simulation Level 1 Auditorium, Level 1 <i>Chair: Dr Michele Martelli, University of Genoa</i>	Interactive sessions 0900 - 1415 Power and propulsion Foyer, Level 3
0900 – 0930	International Naval Safety Association – the first 10 years <i>N Overfield, Chair, INSA Steering Committee, UK; J McKay, INSA Secretariat, Lloyd's Register, UK</i>	Machinery space fire fighting – modern alternatives <i>T Goode, Babcock International Group, UK (Sir Donald Gosling Award Candidate)</i>	Investigating the faulted performance of warship power systems with integrated energy storage <i>L Farrier, University College London, UK (Sir Donald Gosling Award Candidate)</i>	Energy efficient propulsion system for dynamic positioning application: Design and assessment <i>Dr A Coraddu, K Chu, University of Strathclyde, UK; Dr S Donnarumma, Prof M Figari, University of Genoa, Italy</i>	<i>Chairs: Oliver Simmonds, BMT / Prof Dr Ir R G van de Ketterij, Royal Netherlands Naval Academy</i>
0930 – 1000	Selection of standards in naval programmes: Harmonising classification rules with commercial and military standards <i>G G Salas-Berrocal, C Marrugo-Puerta, COTECMAR, Colombia (Sir Donald Gosling Award Candidates)</i>	Royal Canadian Navy – fighting the internal battle with a battle damage control system and embedded kill cards <i>M Nottegar, T Gauthier, Naval Engineering Test Establishment, Canada; S Pakianathan, Department of National Defence, Canada; Y Lamontagne, L3 MAPPS, Canada</i>	Active control of a hybrid energy storage module (HESM) driving transient loads <i>I J Cohen, Dr D A Wetz, University of Texas at Arlington (UTA), USA; J M Heinzl, Naval Surface Warfare Center, USA</i>	Fingerprinting the ship propulsion system: Low hanging fruit or mission impossible? <i>Dr A Vrijdag, Y Sang, Delft University of Technology, The Netherlands</i>	Torsional Vibration Analysis by bondgraph modelling – a practical approach <i>Ing T Heeringa, Heeringa Engineering, The Netherlands</i>
1000 – 1030	Efficient procurement of low vulnerability warships <i>J S Schofield, D J Wright, Survivability Consulting Limited, UK</i>	COSIMAR: Continuous Operational Signature Monitoring Awareness and Recommendation <i>Dr J A A J Janssen, TNO, The Netherlands; H Hasenpflug, M Janssen, CSSM, Germany</i>	Battery & ultra-capacitor based energy storage vessel integration, capabilities, considerations and challenges <i>M Southall, K Ganti, GE Power Conversion, UK</i>	Submarine autopilot performance optimization with system identification <i>Dr F Belanger, Dr X Cyril, L3 MAPPS, Canada; D Millan, National Research Council, Canada</i>	Optimising technique in matching combined diesel engine or gas turbine (CODOG) propulsion system to hull and propeller of a frigate <i>Prof K D H Bob-Manuel, B O Okim, Rivers State University, Nigeria</i>
1030 – 1045	Discussion				Study on intelligent speed control algorithm for diesel engine <i>Dr E Song, C Ma, G Zhao, Dr C Yao, Harbin Engineering University, China</i>
1045 – 1115	Coffee				

**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 finch 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 Papatistodimou, 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, Politecnico di Milano, Italy; Dr F Baldi, École Polytechnique Fédérale de Lausanne (EPFL), Switzerland; E J Boonen, DAMEN Shipyards, 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 <i>Chair: John Forbes, BAE Systems Maritime – Naval Ships</i>	INEC Ship design: Safety and environmental Main Auditorium B, Level 3 <i>Chair: Rob Skarda, Steller Systems</i>	INEC Energy management Main Auditorium C, Level 3 <i>Chair: Prof Campbell Booth, University of Strathclyde</i>	iSCSS Navigation Level 1 Auditorium, Level 1 <i>Chair: Prof Carlos Guedes Soares, CENTEC, Portugal</i>
1415 – 1445	Low-pressure cold metal spray coatings for repair and protection of marine components <i>M Pal, BAE Systems Maritime Services, UK</i>	Environmental modelling and simulation for naval ships <i>Y Abbas, Babcock International Group, UK</i>	Extended heterogeneous controller hardware-in-the-loop testbed for evaluating distributed controls <i>Dr K Schoder, Dr M Stanovich, Dr T Vu, Prof C S Edrington, Dr M Steurer, Florida State University, USA</i>	A random sampling based algorithm for ship path planning with obstacles <i>Dr R Zaccone, Dr M Martelli, Polytechnic School of Genoa University, Italy</i> <i>(Sir Donald Gosling Award Candidates)</i>
1445 – 1515	Condition based data trending to optimise maintenance on Sandown class propulsion system <i>P Richardson, Babcock International Group, UK</i>	The high capacity expanding lifeboat HiCEL – meeting the modern SAR challenge <i>J R E Wright, Ministry of Defence, UK; G E Payne, Steller Systems Ltd, UK</i> <i>(Sir Donald Gosling Award Candidates)</i>	New developments in energy management – battery lifetime incorporation and power consumption forecasting <i>D Mitropoulou, RH Marine Netherlands BV, The Netherlands; L Elling, Netherlands Defence Academy/University of Bath, The Netherlands/UK</i> <i>(Sir Donald Gosling Award Candidates)</i>	Assessment of wind heeling lever determined through CFD against the current naval stability standards <i>J N Alderton, QinetiQ, UK</i> <i>(Sir Donald Gosling Award Candidate)</i>
1515 – 1545	Automatic 3D design tool for fitted spools in shipbuilding industry <i>F Uzcatogui, 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</i>	Effective safety management – the tale of the engineer, safety manager and accountant <i>Dr A Franks, P J James, Lloyd's Register EMEA, UK</i>	Effects of varying ramp rate and amount of ES <i>D Gonsoulin, G Ozkhan, B Papari, Prof C S Edrington, Florida State University, USA</i>	Manoeuvring automation towards autonomous shipping <i>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</i>
1545 – 1600	Discussion			
1600 – 1630	Tea			
AFTERNOON PARALLEL SESSIONS	INEC Support part 2 Main Auditorium A, Level 2 <i>Chair: John Forbes, BAE Systems Maritime – Naval Ships</i>	INEC Safety Main Auditorium B, Level 3 <i>Chair: Keith Howard, Babcock International Group</i>	iSCSS Human factors Level 1 Auditorium, Level 1 <i>Chair: Lt Cdr Frans Geertsma RNLN, Defence Materiel Organisation</i>	
1630 – 1700	An introduction to the Babcock designed super-dock blocks <i>G Kerr, N Georgantzi, Babcock International Group, UK</i>	“Having a blast” – assessment of compartment overpressure following an arc fault <i>A Lane, BAE Systems Maritime Services, UK; P Worthington, Dr I Thompson, W Galloway, G Stark, BAE Systems Naval Ships, UK</i>	Enabling lean manning through automation <i>J Chilcott, N Kennedy, L3 MAPPS UK, UK</i>	

**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

Thursday 4 October 2018

0800 – 0900 Registration and coffee

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

1045 – 1115 Coffee

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

MORNING PARALLEL SESSIONS	INEC Digital transformation part 2 Main Auditorium A, Level 2 <i>Chair: Ian Grant, QinetiQ</i>	INEC UXV Main Auditorium B, Level 3 <i>Chair: Frank Mungo, Egeria Consulting Ltd</i>	INEC QEC Class Main Auditorium C, Level 3 <i>Chair: Lt Cdr Alex Davies RN, Ministry of Defence, UK</i>	iSCSS Human factors Level 1 Auditorium, Level 1 <i>Chair: Toby Drywood, BMT</i>
1145 – 1215	Digitally empowering naval fleet support <i>C Rowley, Dr G Ford, Babcock International Group, UK</i>	JIP LAURA, ensuring future flexible off board capability in todays and tomorrows surface combatants <i>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</i>	HMS Queen Elizabeth Aircraft Carrier: The challenges and successes of commissioning, trialling and delivering an integrated full electric power and propulsion system <i>P A Eaton, GE Power Conversion, UK; D Webster, Thales, UK</i>	No process for initiative <i>CPO G J Parkes, 1710 Naval Air Squadron, Royal Navy, UK</i>
1215 – 1245	Digital – benefits for naval platforms <i>D R Chaderton, GE Power Conversion, UK</i>	Generational shift: How technology is shaping a step change in the future of mine counter-measures <i>J C Rigby, J Johnson, BMT, UK; J McWilliams, QinetiQ, UK</i>	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 <i>M Williams, Thales, UK</i>	Button it: Managing human factors requirement more effectively in expressed designs <i>Dr M J Cook, T Simpson, BAE Systems Submarines, UK</i>
1245 – 1300	Discussion			
1300 – 1415	Lunch			

CLOSING PLENARY SESSION SHIP DESIGN FUTURE CONCEPTS Main Auditorium	
<i>Chair: Cdr Rinze Geertsma RNLN, Chairman, iSCSS 2018</i>	
1415 – 1445	Nonlinear power flow control design methodology for navy electric ship microgrid energy storage requirements <i>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</i>
1445 – 1515	Integration of battle damage repair management in an Integrated Mission Management System <i>Lt Cdr F D Geertsma RNLN, Defence Materiel Organisation, The Netherlands</i>
1515 – 1545	Combat safety and survivability – Combining survivability and safety techniques to address crew safety in combat <i>D Manley, Ministry of Defence, UK</i>
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