CONFERENCE PROGRAMME (subject to amendment)

Tuesday 2 October 2018

0800 – 0900 **Registration and coffee**

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

0915 – 1100 **Welcome and Keynotes Addresses**

1100 – 1130 **Coffee**

OPENING PLENARY SESSION

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

1200 – 1230 **Standing on the shoulders of giants – how autonomous maritime systems can improve more quickly by leveraging improvements in other fields**
Capt C L Benson USAF, *Delft University of Technology/The United States Air Force, The Netherlands/USA*
(Sir Donald Gosling Award Candidate)

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

1300 – 1315 **Discussion**

1315 – 1430 **Lunch**

AFTERNOON PARALLEL SESSIONS	INEC | Submarines	INEC | Systems engineering	INEC | Waste heat recovery	iSCSS | Power systems	iSCSS | Exploitation of marine robotic systems
1430 – 1500	**More than a mission – modelling the impact of a support solution on submarine availability, cost and safety** ***N Dewey, R Young,*** *Babcock International Group, 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)*	**Waste heat recovery with simple Rankine cycle for maritime diesel engines – a simulation study** ***Sub Lt (E) P Eeuwijk RNLN,*** *Royal Netherlands Naval Academy, The Netherlands* *(Sir Donald Gosling Award Candidate)*	**Effect of variable generator ramp-rate on energy storage: A distributed system-level controls study** ***Dr C S Edrington, B Papari, Dr T Vu, D Gonsoulin, D Perkins, H Vahedi,*** *Florida State University, USA*	Paper to be confirmed
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 Field,*** *Rolls-Royce, UK* *(Sir Donald Gosling Award Candidate)*	**Charge air configurations for propulsion diesel engines on fast naval combatants – a simulation study on efficiency and performance** ***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 Stevens USN,*** *US Naval Academy, USA;* ***Dr A Cramer,*** *University of Kentucky, USA*	**WAVE module for hybrid oceanographic autonomous underwater vehicle – prototype experimental validation and characterization** ***A Caiti, Dr R Costanzi, 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;* ***A Caffaz,*** *GraalTech s.r.l., Italy;* ***M Stifani,*** *Naval Experimentation and Support Centre of Italian Navy (CSSN), Italy*
1530 – 1600	**The influence of the facility nuclear safety case on the design of naval refit support equipment** ***H Cole,*** *Babcock International Group, UK* *(Sir Donald Gosling Award Candidate)*	**Systems engineering – the hard way** ***A Edmondson,*** *BAE Systems Maritime - Submarines, UK;* ***B Twomey,*** *Rolls-Royce, UK*	**Evaluation of electric-turbo-compounding applied to marine diesel-engines** ***Prof R Bucknall, S Suarez de la Fuente,*** *University College London, UK;* ***S Szymko, W Bowers,*** *Bowman Power Group Ltd, UK;* ***T Spencer,*** *Lloyd's Register, UK;* ***A Sim,*** *Rolls-Royce, UK*	**Deriving specifications for coupling through dual-wound generators** ***Dr L J Rashkin, J C Neely, D G Wilson, S F Glover,*** *Sandia National Labs, USA;* ***N Doerry,*** *NAVSEA, USA;* ***T J McCoy,*** *McCoy Consulting, LLC, USA*	**USWATH: An innovative USV design towards the extended ship** ***G Bruzzone, A Odetti, M Caccia, M Bibuli,*** *National Research Council ISSIA, Italy;* ***D Calcagni, I Santic, C Lugni,*** *National Research Council INSEAN, Italy;* ***E F Campana,*** *National Research Council DIITET, Italy*
1600 – 1615	**Discussion**				
1615 – 1645	**Tea**				

AFTERNOON PARALLEL SESSIONS	INEC | Applied mechanics	INEC | Enhanced and autonomous navigation	INEC | Electric weapon system integration	iSCSS | Engine control	iSCSS | Exploitation of marine robotic systems
1645 – 1715	**A practical ultrasonic inspection method for detecting and characterising defects found within composite repairs** ***J Downing, A Hook,*** *Babcock International Group, UK* *(Sir Donald Gosling Award Candidates)*	**Past developments provide insights on the future of autonomous vessels: A quantitative approach to the autonomous maritime technology timeline** ***Ir C Kooij, Ir A P Colling, Dr C L Benson,*** *Delft University of Technology, The Netherlands* *(Sir Donald Gosling Award Candidates)*	**The advanced technology corvette (railgun) – future weapons and small ship power systems** ***Dr R Pawling, L Farrier, Prof R Bucknall, Dr M Bradbeer,*** *University College London, UK*	**Robustness analysis of the next generation of EGR controllers in marine two-stroke diesel engines** ***X Llamas, L Eriksson,*** *Linköping University, Sweden*	**OCEANIDS: Building next generation maritime autonomous systems** ***M Furlong, C Harris, A Lorenzo, S McPhail, A Munafó, M Pebody, A Phillips, D Roper, G Salavasidis,*** *National Oceanography Centre, UK*
1715 – 1745	**Remedial solutions for excessive propeller induced hull vibrations on a landing craft** ***B Aktas, W Shi, N Sasaki, P Fitzsimmons, M Atlar,*** *University of Strathclyde, UK;* ***Prof M Fan,*** *Abu Dhabi Ship Building, UAE*	**Enhanced navigation at sea: An augmented reality-based tool for bridge operators** ***Dr M Martelli, 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, Dr S Jian, P Venkatesh,*** *Rolls-Royce@NTU Corporate Lab, Singapore;* ***Dr L Xiong,*** *Rolls-Royce Electrical, Singapore*	**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 advanced guidance & control system for an unmanned vessel with azimuthal thrusters** ***Dr M Bibuli, G Bruzzone, M Caccia, G Camporeale, D Chiarella, R Ferretti, M Giacopelli, A Odetti, A Ranieri, E Spirandelli, E Zereik,*** *The Institute of Intelligent Systems for Automation (CNR-ISSIA), Italy*
1745 – 1815	**FAUSST – bridging the gap between steel and fibre reinforced materials** ***Dr L Molter, Dr R Luterbacher,*** *Center of Maritime Technologies e.V., Germany*	**Hazard analysis of safety control system on the bridge** ***Dr R Puisa, D Vassalos,*** *University of Strathclyde, UK;* ***K Karolius, G Psarros,*** *DNV GL AS, Norway*	**Energy storage design considerations for an MVDC power system** ***Dr L J Rashkin, J C Neely, D G Wilson, S F Glover,*** *Sandia National Labs, USA;* ***N Doerry, S Markle,*** *NAVSEA, USA;* ***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 Ir R Geertsma RNLN, Dr M Godjevac,*** *Delft University of Technology, The Netherlands*	**An acoustic-based approach for real-time deep-water navigation of an AUV** ***A Tesei, M Micheli, A Vermeij, M Mazzi, G Grenon, L Morlando, G Ferri,*** *NATO STO CMRE, Italy;* ***R Costanzi, D Fenucci, A Caiti,*** *Università di Pisa, Italy;* ***A Munafó,*** *National Oceanographic Centre, UK*
1815 – 1830	**Discussion**				
1830 – 2000	**Welcome Reception |** ***INEC/iSCSS 2018 Exhibition area***				

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CONFERENCE PROGRAMME (subject to amendment)

Wednesday 3 October 2018

0800 – 0900 Registration and coffee

MORNING PARALLEL SESSIONS	INEC | Standards	INEC | Damage control and survivability part 1	INEC | Energy storage	iSCSS | System identification and simulation	Interactive session | 0900 – 1115 Power and propulsion part 1
0900 – 0930	**International Naval Safety Association – the first 10 years** ***N Overfield,*** *Chair, INSA Steering Committee, UK*	**Machinery space fire fighting – modern alternative methods** ***T Goode,*** *Babcock International Group, UK* *(Sir Donald Gosling Award Candidate)*	**Investigating the faulted performance of warship power systems with integrated energy storage** ***L Farrier,*** *University College London, UK* *(Sir Donald Gosling Award Candidate)*	**Energy efficient propulsion system for dynamic positioning application: Design and assessment** ***Dr A Coraddu, K Chu,*** *University of Strathclyde, UK;* ***Dr S Donnarumma, M Figari,*** *University of Genoa, Italy*	**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, S Barve,*** *Savitribai Phule Pune University, India*
0930 – 1000	**Warship assessment against IMO 2nd Generation Stability Code** ***D Blakesley,*** *QinetiQ, UK*	**Royal Canadian Navy fighting the internal battle with a battle damage control system and embedded killcards** ***M Nottegar, T Gauthier,*** *Naval Engineering Test Establishment, Canada;* ***S Pakianathan,*** *Department of National Defence, Canada;* ***Y Lamontagne,*** *L3 MAPPS, Canada*	**Active control of hybrid energy storage module (HESM) for pulsed power applications** ***I J Cohen, Dr D A Wetz,*** *University of Texas at Arlington (UTA), USA;* ***J M Heinzel,*** *Naval Surface Warfare Center, USA*	**Fingerprinting the ship propulsion system: Low hanging fruit or mission impossible?** ***Dr A Vrijdag,*** *Delft University of Technology, The Netherlands*	**TVA by bondgraph modelling** ***Ing T Heeringa,*** *Heeringa Engineering, The Netherlands*
1000 – 1030	**Selection of standards in naval programmes: Harmonising classification rules with commercial and military standards** ***G Salas-Berrocal, C Marrugo-Puerta,*** *COTECMAR, Columbia* *(Sir Donald Gosling Award Candidates)*	**COSIMAR: Continuous Operational Signature Monitoring Awareness and Recommendation** ***Dr J Janssen,*** *TNO, The Netherlands;* ***H Hasenpflug,*** *CSSM, The Netherlands;* ***M Janssen,*** *CSSM, Germany*	**Battery & ultra-capacitor based energy storage, vessel integration, capabilities, considerations and challenges** ***M Southall, K Ganti,*** *GE Power Conversion, UK*	**Submarine autopilot performance optimization with system identification** ***Dr F Belanger, Dr X Cyril,*** *L3 MAPPS, Canada;* ***D Millan,*** *National Research Council, Canada*	**Optimising technique in matching a combined diesel engine or gas turbine (CODOG) propulsion system to hull and propulsor of a frigate** ***Prof K D Bob-Manuel, B O Okim,*** *Rivers State University, Nigeria*
1030 – 1045	**Discussion**				**An investigation into contracted loaded tip propellers** ***N Williams,*** *Plymouth University, UK*
1045 – 1115	**Coffee**				

MORNING PARALLEL SESSIONS	INEC | Aviation integration	INEC | Damage control and survivability part 2	INEC | Real time control of power systems	iSCSS | Safety	Interactive session | 1115 – 1415 Power and propulsion part 2
1115 – 1145	**The role of modelling and simulation in the preparations for flight trials aboard the Queen Elizabeth Class Aircraft Carriers** ***M F Kelly, N A Watson, M D White, Prof I Owen,*** *University of Liverpool, UK;* ***S J Hodge,*** *BAE Systems, UK*	**Assessing the availability of main ship functions after damage using a Markov chain** ***A Habben Jansen, A Kana,*** *Delft University of Technology, The Netherlands;* ***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 and utilising experiences from other industries** ***R Campbell, C Allsopp, R Phillips,*** *Frazer-Nash Consultancy, UK* *(Sir Donald Gosling Award Candidates)*	**Incorporation of data forecasting regarding demand and failure of ship power systems into the distributed control architecture** ***Dr T Vu, D Gonsoulin, D Perkins, B Papari, H Vahedi, Dr C S Edrington,*** *Florida State University, USA*
1145 – 1215	**Superstructure aerodynamics of the Type 26 Global Combat Ship** ***R Mateer, P M Scott, Prof I Owen, M D White,*** *University of Liverpool, UK*	**Impact of flinch technology on damage control and survivability** ***D Berenbaum, Dr R Shafie-Pour,*** *L3 MAPPS, 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*	**Marine sector practice for the application of control systems implementing safety critical functions ... is this a sound basis for future technologies?** ***R Bell OBE,*** *Engineering Safety Consultants Ltd, UK;* ***Dr P Davies,*** *Lloyd's Register, UK;* ***Dr B Matellini, Prof J Wang,*** *Liverpool John Moores University, UK*	**The holistic approach to power & propulsion for naval auxiliary vessels** ***S O'Connor, Dr J Stevens,*** *Rolls-Royce, UK* **Study on intelligent speed control algorithm for diesel engine** ***E Song, C Ma, G Zhao, C Yao,*** *Harbin Engineering University, China*
1215 – 1245	**De-risking flight trials using simulation** ***Dr C Ward,*** *Frazer-Nash Consultancy, UK* *(Sir Donald Gosling Award Candidate)*	**The use of network theory based metrics for the assessment of distributed systems architectures on naval platforms** ***G Paparistodimou, A Duffy, P Knight,*** *University of Strathclyde, UK;* ***M Robb, C Voong,*** *BAE Systems Naval Ships, UK*	**Extended heterogeneous controller hardware-in-the-loop testbed for evaluating distributed controls** ***Dr K Schoder, M Stanovich, Dr T Vu, H Vahedi, Dr C S Edrington, M Steurer,*** *Florida State University, USA*	**Hauling safety regulation into the marine industry** ***A LabonteJones, N Lerigo-Smith,*** *L3 MAPPS UK, UK*	
1245 – 1300	**Discussion**				
1300 – 1415	**Lunch**				

AFTERNOON PARALLEL SESSIONS	INEC | Support part 1	INEC | Ship design: Safety and environmental	INEC | Energy management	iSCSS | Navigation	Interactive session | 1415 – 1630 Managing technology and survivability
1415 – 1445	**Cold metal spray coatings for repair and protection of marine components** ***M Pal, D Goodman,*** *BAE Systems Maritime Services, UK;* ***N Gilfillan,*** *Dycomet UK Limited, UK*	**Improving safety and propulsion efficiency of ships using retractable bridge** ***C Maheshwar,*** *Anglo Eastern Maritime Academy, India*	**Mixed-integer linear programming approach as an offline control technique in a hybrid-electric power-propulsion ferry control system** ***N Mohammadzadeh, F Baldi,*** *Fédérale de Lausanne (EPFL), Switzerland;* ***E J Boonen,*** *DAMEN Shipyard, The Netherlands* *(Sir Donald Gosling Award Candidates)*	**A random sampling based algorithm for ship path planning with obstacles** ***R Zaccone, Dr M Martelli,*** *Polytechnic School of Genoa University, Italy* *(Sir Donald Gosling Award Candidates)*	**Maximising workforce productivity across engineering and production – an end-to-end approach** ***P Drayton,*** *Newton, UK* **Three laws good: Technology is a dangerous master** ***J Coulthard, Dr M J Cook,*** *BAE Systems Submarines, UK* **Efficient procurement of low vulnerability warships** ***J S Schofield, D J Wright,*** *Survivability Consulting Limited, UK*
1445 – 1515	**Condition based data trending to optimise maintenance on Sandown class propulsion system** ***P Richardson,*** *Babcock International Group, UK*	**Environmental modelling and simulation for naval ships** ***Y Abbas,*** *Babcock International Group, UK*	**New developments in energy management; now including battery lifetime and power consumption forecasting** ***D Mitropoulou,*** *RH Marine Netherlands BV, The Netherlands;* ***L Elling,*** *Royal Netherlands Navy, The Netherlands* *(Sir Donald Gosling Award Candidates)*	**Assessment of wind heeling lever determined through CFD against the current naval stability standards** ***J Alderton,*** *QinetiQ, UK* *(Sir Donald Gosling Award Candidate)*	
1515 – 1545	**Automatic 3D design tool for spool fitting in shipbuilding industry** ***F Uzcategui,*** *UMI UDC-Navantia, Spain;* ***J Vilar, Á Brage, H Moro,*** *Navantia, Spain;* ***A Paz,*** *Mytech IA, Spain;* ***A Mallo, Dr F Bellas,*** *University of Coruña, Spain*	**The high capacity expanding lifeboat HiCEL – meeting the modern SAR challenge** ***J Wright,*** *Ministry of Defence, UK;* ***G Payne,*** *Steller Systems Ltd, UK* *(Sir Donald Gosling Award Candidates)*	**Distributed energy management for high power ramp rate loads** ***D Gonsoulin, Dr T Vu, D Perkins, B Papari, H Vahedi, Dr C S Edrington,*** *Florida State University, USA*	**The key role of dynamic feedback control in autonomous manoeuvring of ships** ***A U Schubert, M Gluch, O Simanski,*** *University of Applied Sciences Wismar, Germany;* ***M Kurowski, T Jeinsch,*** *University of Rostock, Germany*	
1545 – 1600	**Discussion**				
1600 – 1630	**Tea**				

AFTERNOON PARALLEL SESSIONS	INEC | Support part 2	INEC | Safety	INEC | Electrical power management	iSCSS | Human factors
1630 – 1700	**Optimizing maintenance causing docking alongside** ***A S I M A Ghowel,*** *Kuwait Oil Company, Kuwait*	**Effective safety management – the tale of the engineer, safety manager and accountant** ***A Franks,*** *LR Consulting, UK;* ***P James,*** *LR Marine and Offshore, UK*	**Model predictive control of hybrid power system configuration and load sharing in marine vessels** ***A R Dahl, L Thorat,*** *Norwegian University of Science and Technology, Norway* *(Sir Donald Gosling Award Candidates)*	**Enabling lean manning through automation** ***J Chilcott, N Kennedy,*** *L3 MAPPS UK, UK*
1700 – 1730	**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 arcing fault** ***P Worthington, I Thompson, W Galloway, G Stark,*** *BAE Systems Naval Ships, UK;* ***A Scott, A Lane,*** *BAE Systems Maritime Services, UK*	**Nonlinear power flow control design methodology for navy electric ship microgrid energy storage requirements** ***Dr D G Wilson, S F Glover, M A Cook,*** *Sandia National Labs, USA;* ***W W Weaver, R D Robinett,*** *Michigan Technological University, USA;* ***J Young,*** *OptimoJoe, LLC, USA;* ***S Markle,*** *NAVSEA, USA;* ***T J McCoy,*** *McCoy Consulting, LLC, USA*	**Model based design – the solution to training** ***D Khan, D Moore,*** *L3 MAPPS UK, UK*
1730 – 1800	**HMCS Victoria repair work period – a strategic partnership between a naval repair facility and an industry partner fostering ground up cultural change and pushing the limits of integration at the waterfront** ***Cdr A Bagga RCN,*** *Royal Canadian Navy, Canada;* ***T Dupuis,*** *Babcock Canada, 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*	**Distributed power management implementation for zonal MVDC ship power systems** ***D Perkins, Dr T Vu, H Vahedi, D Gonsoulin, B Papari, Dr C S Edrington,*** *Florida State University, USA*	**Lighting future naval ships – mission optimized and human centric** ***G G Langer,*** *Thyssenkrupp Marine Systems GmbH, Germany;* ***N Launert, U Hoven,*** *LINKSrechts GmbH, Germany*
1800 – 1815	**Discussion**			
1830	**Transportation to The Riverside Museum**			
1900 – 2100	**Conference Reception, The Riverside Museum**			

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CONFERENCE PROGRAMME (subject to amendment)

Thursday 4 October 2018

0800 – 0900 Registration and coffee

MORNING PARALLEL SESSIONS	INEC | Digital transformation part 1	INEC | Electric and hybrid	INEC | Environmental compliance	iSCSS | Power conversion
0900 – 0930	**Enabling, equipping and empowering the maritime support enterprise through digital transformation** *Lt Cdr R T A Hancock RN, S N Waterworth, Lt Cdr R J McClurg RN, Capt M T W Bolton RN,* Ministry of Defence, UK	**Light frigate low-speed electric drive – when does it make sense?** *S Newman, O Simmonds,* BMT, UK	**Instead of simply asking "what?", naval engineers need to ask "what for?": 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 Vu, F Diaz, D Gonsoulin, D Perkins, B Papari, H Vahedi, Dr C S Edrington,* Florida State University, USA
0930 – 1000	**Personnel, material, and mission – EHM impact** *Lt Cdr A Mascarenhas RCN,* Royal Canadian Navy, Canada; *Y Lamontagne,* L3 MAPPS, Canada	**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 electronics converters for energy routing in shipboard power systems** *Dr H L Ginn, J Bakos, A Benigni,* University of South Carolina, USA
1000 – 1030	**Turning data into reality** *S Leinster-Evans,* BAE Systems, UK; *S Luck,* BMT, UK; *J Newell MBE,* J2Consulting, UK	**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 Parker, E Trinklein, R D Robinett,* Michigan Technological University, USA; *T J McCoy,* McCoy Consulting LLC, USA
1030 – 1045	**Discussion**			
1045 – 1115	**Coffee**			

MORNING PARALLEL SESSIONS	INEC | Digital transformation part 2	INEC | UXV	INEC | QEC Class	iSCSS | Human factors
1115 – 1145	**Generating a cyber resilient fleet, a platform system perspective** ***S Buckle,*** *Ministry of Defence, UK*	**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 the technical challenge** ***J K McKelvie, P Lakey,*** *L3 MAPPS UK, UK*
1145 – 1215	**Cyber security – need of the era** ***Lt Cdr A Ahuja IN,*** *Indian Navy, India*	**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*	**OHMS Queen Elizabeth Aircraft Carrier: The challenges and successes of commissioning, trialling and delivering an integrated electric power and propulsion system** ***P Eaton,*** *GE Power Conversion, UK;* ***D Webster,*** *Thales, UK*	**No process for initiative** ***CPO G J Parkes,*** *1710 Naval Air Squadron, 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 Rigby, J Johnson, D Ridgwell,*** *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 Naval, 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

1415 – 1445	**Future concepts in multi-role ship design** ***D Smith, D Evans,*** *Naval Design Partnering Team, UK*
1445 – 1515	**Integration of battle damage repair management in an Integrated Mission Management System** ***Lt Cdr F Geertsma RNLN,*** *Defence Materiel Organisation, The Netherlands*
1515 – 1545	**Combat safety and survivability in the Royal Navy** ***D Manley,*** *Ministry of Defence, UK*
1545 – 1600	**Discussion**
1600 – 1615	**Closing Summary**
1615 – 1625	**Presentation of the Sir Donald Gosling Award**
1625 – 1630	**Closing Remarks | *Capt Matt Bolton RN,*** *Chairman, INEC 2018*
1630	**Close of Conference**