



Wargaming for Professionals

King's College London

September 5th – 7th 2017

Day 1: Tuesday 5 September 2017

Time	Event	Chair/Speakers	Remarks
0900 - 0930	Arrivals and coffee – KCL Strand Entrance		Collect security badge
0930 - 0940	Welcome and introduction – Lucas Lecture Theatre	Maj Tom Mouat, SO2 Modelling and Simulation UK Defence Academy	
0940 - 1020	Wargaming 101 for new-comers – Lucas Lecture Theatre	Maj Tom Mouat	Simultaneous
	Megagame 202: Designing the megagame – K4U.04 (4 th floor)	Jim Wallman, Past Perspectives, and Prof Rex Brynen, McGill University	
1040 - 1300	<p>Megagame</p> <p>Dire Straits: A megagame designed by Jim Wallman and Rex Brynen to explore a potential crisis involving China, Taiwan, and beyond – K4U.12 and K4U.04 (4th floor)</p> <p>Drinks 1020 – S-3.18, S-2.23 and S-2.25 Drinks 1200 – K4U.12 (UN room)</p>	<p>Jim Wallman and Prof Rex Brynen</p> <p>Jerry Elsmore Rob Cooper Bob Cordery Jon Casey</p>	Active learning experience
1300 - 1400	Lunch – Terrace Cafe		Working buffet lunch – the game goes on!
1400 - 1645	<p>Megagame – K4U.12 and K4U.04</p> <p>Dire Straits</p> <p>Drinks 1645 – S-3.18, S-2.23 and S-2.25</p>	<p>Jim Wallman and Prof Rex Brynen</p> <p>Jerry Elsmore Rob Cooper Bob Cordery Jon Casey</p>	Active learning experience
1710 - 1800	Megagame After Action Review – Lucas Lecture Theatre	Jim Wallman and Rex Brynen	
1800	Buffet supper – Terrace Cafe		Cash bar
1830 -	<p>Informal games session – K4U.12 and K4U.04</p> <p>Bring a game, find a table – and play</p>		No central organisation

Day 2: Wednesday 6 September 2017

Time	Event	Chair/Speakers	Remarks
0830 - 0900	Arrivals and coffee – KCL Strand Entrance		Fire Alarm Test 0900
0900 - 0915	Welcome and introduction to Connections UK – Lucas Lecture Theatre	Prof Phil Sabin, Maj Tom Mouat and Graham Longley-Brown	
0915 - 1030	Plenary 1: UK military Tri-Service wargaming – Lucas Lecture Theatre Drinks 1030 – 1100 – S-3.18, S-2.23 and S-2.25	Chair: Howard Body, MOD Flt Lt Colin Bell, RAF – Air Warfare School wargaming Ed Oates, RN – Wargaming in training: the road to recovery Cdr Matt Payne, RN – The green shoots of Royal Navy wargaming Lt Col Nigel Jordan-Barber, SCOTS – Standing Joint Force HQ wargaming	15 minutes per speaker then 15 minutes Q&A
1100 - 1215	Plenary 2: US and UK military and Foreign & Commonwealth Office wargaming initiatives – Lucas Lecture Theatre	Chair: Colin Marston, Dstl Cdr Phil Pournelle – US ongoing wargaming initiatives Matt Caffrey – long-term wargaming lessons learned Owen Elliott – Gaming in the FCO Col George Wilson, Development, Concepts and Doctrine Centre – <i>The Defence Wargaming Handbook</i>	15 minutes per speaker then 15 minutes Q&A
1220 - 1250	Key note address – Lucas Lecture Theatre	Senior representative from MOD Main Building	20 minutes then 10 minutes Q&A
1250 - 1300	Games Fair Introduction – Lucas Lecture Theatre	Prof Phil Sabin	Games signed up to pre-conference
1300 - 1400	Lunch – Terrace Cafe	Set up games	Working Lunch
1430 - 1700	Games Fair Session 1 - K4U.12 and K4U.04 Drinks 1600 – K4U.12		Games signed up to pre-conference
1700 - 1800	Plenary 3: Broader perspectives on wargaming – Lucas Lecture Theatre	Charles Vasey - Current design ideas in hobby gaming Paul Strong, Dstl – The Western Approaches Tactical Unit; a British wargaming exemplar	20 minutes then 10 minutes immediate Q&A per speaker
1800 - 1900	Supper – Terrace Cafe		Buffet with cash bar (until 2000)
1900 - 2200	Games Fair Session 2 - K4U.12 and K4U.04		Games signed up to pre-conference

Day 3: Thursday 7 September 2017

Time	Event	Chair/Speakers	Remarks
0845 - 0900	Arrivals and coffee – KCL Strand Entrance		
0900 - 1015	Plenary 4: Wargaming in education – Lucas Lecture Theatre	Chair: Prof Phil Sabin Mauro Faina Prof Richard Barbrook, University of Westminster Paul Howarth, Story Living Games Dave Manley, Naval Authority Group and Dr Nick Bradbeer, UCL - The Application of Wargaming to Education in Naval Ship Design and Survivability	15 minutes per presentation then 15 minutes Q&A
1020 - 1105	Plenary 5: Simulating the intangible – Lucas Lecture Theatre Drinks 1105 – 1130 – S-3.18, S-2.23 and S-2.25	Chair: Dr Aggie Hirst, KCL Jeff Appleget and Rob Burks, US Naval Postgraduate School – Modelling Human Terrain Maj Tom Mouat and Anja van der Hulst, Netherlands TNO – Matrix and Seminar Games	15 minutes per presentation then 15 minutes Q&A
1130 - 1230	Plenary 6: Wargame design and analysis – Lucas Lecture Theatre	Chair: Brian Train Jim Wallman and Rex Brynen – The Megagame Erik Nordstrand, FOI – Swedish wargaming Ivanka Barzashka – Missile Defence Wargame	15 minutes per presentation then 15 minutes Q&A
1230 - 1330	Lunch – Terrace Cafe		Buffet
1330 - 1345	Breakout introduction – Lucas Lecture Theatre The intention is to take one or more topical subjects and develop several nascent approaches that tackle the issues at different levels (e.g. tactical or operational) using varied wargaming techniques	Chair: Maj Tom Mouat Groups, facilitators and locations TBC	One topic will be 'The High North' (Arctic) and a choice of a topic from: Failed Cities; Extreme Weather; Human Augmentation; Surveillance, Drones & Robots; and Corruption & Money
1345 - 1500	Breakout Drinks 1500 – S-3.18, S-2.23 and S-2.25	Facilitated syndicates	
1515 - 1615	Breakout back briefs and discussion	Chair: TBC	
1615 - 1630	Closing remarks	Prof Phil Sabin/Graham Longley-Brown	

Speaker and Chair Biographies

Dr. Jeff Appleget is a retired Army Colonel who served as an Army Operations Research analyst at the Center for Army Analysis (2 years) and the TRADOC Analysis Center (10 years, serving tours at TRAC-Monterey, TRAC-White Sands Missile Range, TRAC-Fort Leavenworth, and TRAC Headquarters). He teaches the Wargaming Analysis and Combat Modeling courses at NPS. He also teaches week-long Basic Analytic Wargaming Mobile Training Team (MTT) course, with the most recent offering conducted in China Lake, CA for the U.S. Naval Air Systems Command. He is the Joint Warfare Analysis Center (JWAC) Chair of Applied Operations Research at NPS. His research interests include Irregular Warfare and Stability Operations modeling, Amphibious Operations modeling, Wargaming, Combat Modeling, Survey Data modeling and analysis, Verification, Validation, and Accreditation (VV&A) of DoD models and data, and Integer Programming. He was recently appointed to the NATO Technical Team of SAS-130 examining Course of Action Analysis for the 21st Century. He was a member of the NATO SAS-091 Specialist Team (2012 Research and Technology Organization Scientific Achievement Award winner) that developed metrics to support decisions for the transition of responsibilities from ISAF to the Afghanistan Government. His other major awards include the Richard W. Hamming Faculty Award for Interdisciplinary Achievement (2016), Army Modeling and Simulation Office Analysis Award (2011), Dr. Wilbur B. Payne Memorial Award for Excellence in Analysis (1991 and 2003), Simulation and Modeling for Acquisition, Requirements, and Training (SMART) Award (2001 and 2003), and 1990 Concepts Analysis Agency Director's Award for Excellence. He served on the Military Operations Research Society (MORS) Board of Directors from 2000-2004.

Dr Richard Barbrook is Senior Lecturer in Politics at the University of Westminster, London. He is a founder member of Class Wargames which is a group of academics, artists and activists interested in politico-military simulations, especially Guy Debord's The Game of War. His book - Class Wargames: ludic subversion against spectacular capitalism - which details their adventures in Europe, Russia and Brazil was published by Minor Compositions/Autonomea in 2014. Richard has also written extensively on the history and future of the Net and coordinated the creation of the Digital Democracy Manifesto for Jeremy Corbyn's 2nd campaign for the Labour leadership. Richard was part of the Games for the Many team which created CorbynRun for Labour's 2017.

Ivanka Barzashka is a researcher at King's College London's Defence Studies Department, which is part of the Joint Services Command and Staff College of the UK Defence Academy. She manages a project that examines how ballistic missile defense (BMD) affects nuclear risks in the changing strategic environment through qualitative analysis, physical modelling and wargaming. The study focuses on understanding nuclear escalation among the United States, NATO and Russia. Barzashka has held visiting research positions at Stanford University's Center for International Security and Cooperation and the Bulgarian Academy of Sciences, where she assessed technical options for BMD cooperation between NATO and Russia. Previously, she managed the Federation of American Scientists' interdisciplinary assessment of Iran's nuclear capability. She holds a BS in physics from Roanoke College in Virginia and an MA in science and security (with distinction) from King's College London, where she is currently pursuing a PhD in war studies research.

Colin Bell is a serving RAF Flight Lieutenant, currently at the Air Warfare School. A trainer on the Basic Air Warfare Course, he is part of the team that teaches initial officer trainees at RAF Cranwell. An Airspace Battle Manager by background, he has served on the frontline of Air Defence and Ballistic Missile Early Warning within the UK at RAF Boulmer and RAF Fylingdales and on the Falklands within 303 Signals Unit. An avid wargamer, he has been developing methods of using gamified learning on the BAWC to help trainees utilise the concepts they are being taught and

facilitate understanding. He has recently been selected to start a Masters in Air Power at KCL through the CAS Fellowship scheme.

Howard Body was born and raised in Christchurch, New Zealand. After a short experience with the New Zealand Army he ran away to sea and joined BRNC Dartmouth in May 1979 to begin what would be 21 years service with the Royal Navy. A varied career path saw him undertake an in-service degree (History, KCL), a postgraduate year in International Security Policy (Geneva), serve in conventional submarines, an exchange post with the RAF, a training role with the Royal Marines and finally as MA to the (German) Chief of Staff at SHAPE. Retiring mid-career in 2000 Howard returned home to NZ for 18 months before taking up a role as an analyst with the UK MODs Defence Science and Technology Laboratory, Dstl in 2002, where he was responsible, amongst other things for the Joint Campaign Development (now Strategic Force design) and Stabilisation (COIN) studies. Accepting a secondment to MOD he coordinates all decision support activity -primarily strategic analysis, his core area of interest- for the Security Policy and Operations Directorate. His current focused areas of responsibility are in the introduction of wargaming and strategic Net Assessment across the department and the Department as part of an initiative to enhance the MODs approach to strategic planning. Howard is married with four boys and lives in Haslemere, Surrey.

Nick Bradbeer is a naval architect working for the MoD, currently as the Lecturer in Naval Architecture at University College London. His career has been split between the MoD and academia, with a focus on ship design and naval vulnerability reduction. With a broad interest in gaming, simulation and operational analysis, he has developed a series of wargames and OA activities and incorporated them into the naval architecture teaching syllabus at UCL.

Rex Brynen is Professor of Political Science at McGill University and nonresident Senior Fellow at the Atlantic Council, specializing in Middle East politics and regional security; peace, stabilization, and humanitarian operations; and political-military wargaming. He is author or editor of some eleven books on the Middle East, including *Beyond the Arab Spring* (2012). He is senior editor of the conflict simulation website PAXsims (<http://www.paxsims.org>), designer of the humanitarian crisis simulation AFTERSHOCK and MaGCK: Matrix Game Construction Kit, and a past winner of the International Studies Association's Deborah Gerner Innovative Teaching Award for his work on classroom simulations. In addition to his academic work, Professor Brynen has served as an intelligence analyst, and as a consultant to various governments, United Nations agencies, and the World Bank.

Colonel (R) Robert E. Burks, Jr. is an Associate Professor in the Defense Analysis Department of the Naval Postgraduate School (NPS). He holds a Ph.D. in Operations Research from the Air Force Institute of Technology, a M.S. in Operations Research from the Florida Institute of Technology and a bachelor's degree in Aerospace Engineering from the United States Military Academy. He is a retired logistics Army Colonel with more than thirty years of military experience in leadership, advanced analytics management and logistics operations who served as an Army Operations Research analyst at the Naval Postgraduate School, TRADOC Analysis Center, United States Military Academy, and the United States Army Recruiting Command. He has led multiple analytical study teams responsible for Army Transformation (organizational change) issues and his work includes applying analytical methods to develop solutions for complex problems in support of the Combined Arms Support Command, the Army's sustainment think tank and premier sustainment learning institution. In addition, he has served as the technical expert on studies involving deployment, equipping, manning, training, and logistics operations of military forces in multiple theaters of operation. He currently teaches the Modeling for Decision Making and Statistics Courses at NPS. His research interests include Irregular Warfare and Stability Operations modeling, Information Operations modeling, Wargaming and Agent Based Modeling and Simulation. His recent major awards include

the Military Leadership Award (2013), Joint Service Warfare Award (2013), Military Operations Research Journal Award (2011) for developing analytical methods for solving the Theater Distribution Problem, and the Omar Bradley Fellowship for the Study of Mathematical Sciences (2011).

Mr. Matthew B. Caffrey Jr. is the Air Force Material Command (AFMC) Lead for the Air Force Chief of Staff's Title 10 far term wargame, and AFMC's integrator for Air Force Research Laboratory (AFRL) Wargaming. Previous positions include the AFRL Liaison to AFMC for Wargaming and Lead, Future Warfare Analysis Team, Directorate of Plans and Programs, HQ AFRL. He has previously served as the Professor of Wargaming and Campaign Planning at the Air Command and Staff College (ACSC), Research Associate at the School of Advanced Airpower Studies, and Senior Analyst for the SYSCON Corporation, serving at the Air Force Wargaming Institute, all at Air University, Maxwell AFB, Alabama. A retired Colonel in the Air Force Reserve, his final assignment was as Senior Reservist, Information Directorate, AFRL. His previous military assignments include; Chief, Wargaming Strategy Development, with the Air Staff's Checkmate Division, the Pentagon, Washington DC and assignments at the major air command, wing, group and squadron levels. He is the developer of the 3rd Generation Wargame concept, the Strategy/Innovation Cycle (sometimes called the Caffrey Loop) and the Caffrey Triangle. In 1993 he helped found the Connections interdisciplinary wargame conference. He also helped found Connections UK in 2013, Connections Australia in 2014 and Connections Netherlands in 2015. He created the ACSC Wargame Elective, the AFRL Wargame Course and the AFMC Wargame Course. Matt is the designer of AFMC's Agile Combat Support – Science and Technology Wargame, the AFMC/Royal Air Force Agile Combat Support – Science and Technology wargame, the Air Force Research Laboratory (AFRL) Wargame, the Engineer/Strategist Exercise, Joint Resource Allocation Exercise (JRAX), the Joint Deployment Employment Exercise (JDEX), and several other wargames. He co-authored the Gulf War Fact Book, and has written several chapters and many articles on wargaming, airpower, and defense issues. He has addressed international audiences on wargaming; including German War College, the United Kingdom's Defense Research Establishment. His US audiences extend from The Pentagon to Silicon Valley. A former member of the Air University and the Armed Forces Staff College Red Teams, he has served on Blue, Red or White teams for Air Force, Navy and Army Title 10 Wargames. His latest book, *On Wargaming, how wargames have shaped the past and may shape the future*, is on track to be published by the Naval War College Press in 2017.

Owen Elliott is Head of the Africa Research Group in the UK Foreign & Commonwealth Office, responsible for policy-relevant political and historical research on sub-Saharan Africa. He joined the FCO in 1994, having previously been in UK Defence Intelligence where, among other things, he had been the DI representative to the British Army Divisional Wargame. He spent four months in the HQ of 1 (UK) Armd Div in Iraq in 2003, and set up the MOD's capability to study Middle Eastern media in the aftermath of 9/11. He was also a TA (Reserve) Infantry officer and taught tactics and doctrine in a Specialist Training Team. His first degree was in Modern History and he has an MPhil in International Relations from the University of Cambridge.

Mauro Faina was born in Latina (not so far from Rome), on September 9, 1964. Married. He has a Foreign Languages Degree and a certificate about Programming Languages. He joined the Italian Army in 1989 as a Lieutenant but, after two years, resigned and started an IT company. In 2003 he had the chance to become a teacher and so left the IT company and began to teach English Language in High School. He is the president of the most important Board Wargames Association in Italy (Causus Belli) and has been playing wargames since age 14. His talk will be about Wargaming and Education since he has been running for more than 4 years a project in his Italian school about the use of Board Wargames to improve students' soft skills and their knowledge of History and English Language. The Italian Ministry of Education officially supports and finances this project.

Dr Aggie Hirst is Lecturer in International Relations Theory and Methods at King's College London. Her current Pump Priming-funded research project examines the ways in which the US military uses wargames and simulations as pedagogical tools, and the implications of this for service members and the changing character of military doctrine and warfare. She is author of *Leo Strauss and the Invasion of Iraq: Encountering the Abyss* (Routledge: 2013, 2016), and has published in high-profile scholarly journals including *Millennium: Journal of International Studies*, *Globalizations*, and *International Politics*. She completed her ESRC-funded PhD at the University of Manchester in 2010, and has ten years of research and teaching experience in the HE sector.

Anja van der Hulst studied Educational Technology and received her PhD in Artificial Intelligence and Education from the University of Amsterdam. Since then, she has been active in developing and researching a series of Serious Games for safety and security at the Netherlands Research Organisation TNO. Her main interests are in developing concepts for good experiential learning with games and in conflict modelling for gaming, with a focus on political, economic and social/cultural factors in conflict. Since 2013, she also lectures in the master program Game Studies at the University of Amsterdam.

Paul Howarth has enjoyed a varied career, in the intervening years between studying theology in Southampton and recently qualifying as a hypnotherapist. He has taught in primary schools as well as spending 10 years on the senior leadership teams of secondary schools in Barnsley, leading on systemic change, strategic planning and the development of student leadership. In between he worked in sports development, training teachers and then the implementation of school sport and community partnerships across Yorkshire as part of a national programme. Having been introduced to wargaming at the age of 5, Paul also enjoys boardgaming and roleplaying, although in the last few years megagaming has occupied more of his hobby time, along with cycle touring. Paul set up Pennine Megagames (www.penninemegagames.co.uk) in 2015, designing and running hobby games in the north of England, as well as helping others do the same. To date 14 games have been delivered in the last two years, covering a wide range of subjects. Looking to combine his education and games involvement, Paul set up Story-living Games to develop activities for young adults, including crisis management, the Celts in Britain, Ancient Greece and 1940. In addition to these Paul is now developing new games for adults and is particularly keen to find ways of engaging non-gamers.

Nigel Jordan-Barber is a British Army Officer assigned to the Standing Joint Force Headquarters as SO1 J3 (Operations), based at Northwood. He has served for 21 years split between regimental duty (infantry) and staff appointments (shared between delivering individual training, and joint operations). As an operational planning team leader, he is responsible for the development of a variety of wargaming techniques for use within the Standing Joint Force Headquarters Group in training, and for operations. Most recently this has included the development of a wargame to prepare the Standing Joint Force Headquarters for joint theatre entry in an anti-access and area-denial environment. His focus is developing wargames for use in operational level HQs.

Graham Longley-Brown has wargamed since aged eight. He always preferred umpiring and creating scenarios to playing – and generally losing. He delights in wargame rules and has been known to laugh out loud at particularly clever mechanisms. A British Army Officer since 1986 (and still in the Reserves), he has used wargaming for professional purposes throughout his career, often as a lone champion for the technique. He was the UK Joint Services Command and Staff College Directing Staff Subject Matter Expert for wargaming from 2000-2002. Since leaving the Regular Army in 2003, Graham has made a living as a self-employed consultant in all-matters professional wargaming. He has designed and delivered wargames at UK, European and Gulf State Staff Colleges, for the UK Field

Army at all levels, the NATO Joint Warfare Centre, the UK Future Force Development programme, Dstl, the American, British, Canadian and Australian Armies Programme, the Royal Brunei Armed Forces, the Pakistan National Defence University, the US Army in Europe and many others. He is the leading developer of the Dstl/Cranfield manual simulation the Rapid Campaign Analysis Toolset (RCAT). He is a published author on professional wargaming: he was the lead author for the recently published UK MOD *Wargaming Handbook*; and writing the current Course of Action Wargaming section for the UK Army's *Staff Officer's Handbook*, which he also teaches. The purpose of his website (www.lbsconsultancy.co.uk) – and all his work – is to spread wargaming best practice. He is a co-founder and member of the organising committee for the Connections UK professional wargaming conference www.professionalwargaming.co.uk.

David Manley is a naval architect heading up the Naval Authority Group Ship Division and Integrated Survivability Team in the MOD's Submarine Delivery Agency. He has worked in the MOD for 28 years, 17 of which have been in maritime survivability where he served as the Dstl Technical Adviser for survivability and submarine R&D. David has been a wargamer for over 40 years, and a published author of over 20 commercial sets of rules and numerous articles since 1990, focussing mainly on naval and air wargaming. He has worked with the RN's Maritime Warfare Centre and Dstl on a number of wargaming and OA projects covering recent operational scenarios and concept development of future warships and submarines. He is currently sponsoring UCL's development of wargaming as an educational tool for trainee naval architects, marine engineers and combat systems engineers, and is driving the development of these tools as an aid to young engineers within DE&S and the Submarine Delivery Agency.

Colin Marston is a Principal Analyst within the Wargaming Team at the Defence Science and Technology Laboratory (Dstl). He has predominantly worked in the Support to Operations (S2O) environment, having been deployed as an Operational Analyst to Afghanistan and Iraq. At Dstl, he has project managed and provided technical leadership to a range of projects and has been involved in numerous international research collaborations. He ran Dstl's Stabilisation Programme for five years, which involved delivering numerous wargames using PSOM (a Peace Support Operations Model) for a range of NATO and MOD customers. In 2011 he was the Field Team Leader responsible for two large deployments of analysts (Dstl and US) to deliver wargames to support the future planning of the International Security Assistance Force (ISAF) mission in Afghanistan. This work received a Chief Scientific Award. It was also awarded the OR Society's President's Medal in 2012. He is the Technical Partner, alongside Cranfield University, for the Rapid Campaign Analysis Toolset (RCAT), a manual simulation tool that is used to support /enable a wargame. More recently, he has sponsored the development of the Matrix Game Construction Kit (MaGCK). He is a Fellow of the OR Society (FORS), has a BSc (Hons) in Physics with Astrophysics and served in the Army Reserve (Infantry). He is also a co-founder and member of the organising committee for the Connections UK professional wargaming conference (<http://www.professionalwargaming.co.uk>) in addition to being a co-author on the recently published UK MOD *Wargaming Handbook*.

Tom Mouat is a serving officer currently working at the Defence Academy of the UK where he is the Directing Staff Officer for Simulation and Modelling. He has over 30 years of experience in training, military exercise planning, simulation systems and wargaming. He has an MSc in Defence Simulation and Modelling and holds a PGCE. He has experience in a wide range of military training systems from the lower tactical level to the higher strategic level, as well as spending 5 years in the procurement of these systems. In addition, he lectures on simulation, modelling and wargaming (most recently in China and Poland); has designed games for education, including the MaGCK: Matrix Game Construction Kit; and facilitated Wargame events for diverse audiences, worldwide.

Erik Nordstrand is Research Director at the Swedish Defence Research Agency (FOI). He has a Ph.D. in Analytical chemistry and has worked full-time at FOI with analytical gaming for more than ten years. Starting as an Operational researcher twenty years ago for the AF Headquarters he worked in that role both with long and short term defence planning and studies of different weapon systems. Involved early in gaming activities he gradually made that his almost full-time occupation at FOI. Erik has a broad experience of running seminar games for both the military and the civilian field as well as the experience of games on a wide range of problems in these contexts. Erik has among other things been responsible for and conducted small and large seminar games including: TTP:s for helicopters in Afghanistan, long and short term defence planning, the reorganisation of peace time organisations of the AF headquarter and different services, the need to change the present laws in order to better respond to terrorist attacks (Department of Justice) and bi-nationally; looking at the need of research in order to better handle the effects of terrorist attacks (the Swedish Civil Contingencies Agency (present name) with the U.S. Department of Homeland Security). Erik has written several manuals (only in Swedish at this moment) on seminar games for analytical purposes and held courses at the FOI Division of Defence Analysis in this field and on long term defence planning for the Baltic Defence College. He is also responsible for the war gaming club at FOI and an active participant in the Swedish Defence College's board (war) gaming club.

Ed Oates trained as aircrew with the Royal Navy from 1980, becoming an instructor in 1987. He has worked as a Trials Engineer for AgustaWestland, a Synthetic Environment specialist for the Royal Navy, and a training system Procurement Officer with UK's DE&S. He's been involved with training systems from the beginnings of specification, through development, test and acceptance, to in-service support. Ed currently works as an Aircrew Instructor in the Merlin Mk2 Helicopter Simulator at RNAS Culdrose, UK. He's involved in training design, quality control and training delivery for anti-submarine warfare specialists. Relevant published papers include: 'Discrete Event Simulation in Training System Procurement' (the title from his MSc dissertation in Simulation and Modelling from Cranfield University); and 'Crowdsourcing for Innovation and Design' (which looks at where computer animations and games can achieve innovative solutions, the area of Ed's current studies). In his spare-time, he works with the Royal Naval Reserve as a Lieutenant-Commander with the Maritime Warfare Centre providing Operational Analysis support to Head Quarters and Battle Staff. The MoD's renewed interest in Wargaming has seen drawn Ed in to support reviews of where they may be employed within training systems. After completing the 'Introduction to Wargaming' course at Shrivenham in June 2016, and attending Connections UK last year, he has been closely involved in the development of a maritime wargame for 824 Naval Air Squadron.

Commander Matt Payne is a Royal Navy Warfare Officer employed as head of the Operational Planning Pillar in the Maritime Warfare Centre in Portsmouth where he is currently attempting to reinvigorate wargaming in the RN. Having served the majority of his career at sea, in areas from Northern Ireland through to Libya, his recent experience has seen him becoming more involved with maritime planning and operations assurance. Most recently, after undertaking advanced staff training at CESEDEN, the Spanish Staff College in Madrid, he spent 2 years as the lead planning officer for the Maritime Battle Staff based at Whale Island in Portsmouth. His prior experience of wargaming and game design was limited to course of action wargaming as part of validation of maritime exercise and standing response plans however since taking up his current post he has begun to investigate wargaming across a broad range of areas of from tactical development through to procurement. Although he has attempted to design both manual simulations for tactical and operational level gaming and has hosted a Matrix game within MWS his experience is currently limited, but growing.

Phillip Pournelle served as a surface warfare officer on cruisers, destroyers, amphibious ships, and a high-speed vessel for 26 years in the U. S. Navy before retiring as a Commander. He is an operations

analyst with a Master's degree from the Naval Postgraduate School in Monterey, California. His last five years of service in uniform were as a Military advisor to the Director of the Office of Net Assessment. He is currently a senior director for wargaming and analysis at the Long Term Strategy Group (LTSG) in Washington, D.C

Philip Sabin is Professor of Strategic Studies in the Department of War Studies at King's College London. He has worked closely with the UK military for many years, especially through the University of London Military Education Committee, the Chief of the Air Staff's Air Power Workshop, and KCL's academic links with the Defence Academy and the Royal College of Defence Studies. Professor Sabin's current research and teaching involves strategic and tactical analysis of conflict dynamics, with a particular focus on ancient warfare and modern air power. He makes extensive use of conflict simulation techniques to model the dynamics of various conflicts, and since 2003 he has taught a highly innovative MA option module in which students design their own simulations of past conflicts. He has written or edited 15 books and monographs and several dozen chapters and articles on a wide variety of military topics. His recent books *Lost Battles* (2007) and *Simulating War* (2012) both make major contributions to the scholarly application of conflict simulation techniques. Besides co-organising the annual Connections UK conference at KCL, he has taken part in several defence wargaming projects, and he recently worked with the British Army's Centre for Historical Analysis and Conflict Research to help to design a Camberley Kriegsspiel with which officers may practise battlegroup tactics. Professor Sabin has appeared frequently on radio and television, and has given many lectures and conference addresses around the world.

Edward Stringer joined the Royal Air Force via its University Cadetship scheme and an engineering degree from Liverpool University. After officer and flying training he was posted to the Jaguar Force where he became a Qualified Weapon Instructor and spent a tour at Boscombe Down in Operational Test and Evaluation. He has completed many operational tours including the Gulf war of '91, the 'No Fly Zones' over Iraq and Bosnia between '91 and '03, and the recent counter-insurgency operations in Iraq and Afghanistan. Edward's command tours include: OC 54(F) Squadron, when he was also the Jaguar Force Commander for Operation TELIC in Iraq in 2003; Station Commander RAF Leeming and, concurrently, Tornado F3 Force Commander; CO 904 Expeditionary Air Wing based at Kandahar, Afghanistan in 2008; Commandant Air Warfare Centre, from '09 to '11, during which he was also the UK's first Air Contingent Commander for Op UNIFIED PROTECTOR, the NATO Operation in Libya. He has completed staff tours in the Air Warfare Centre, the Directorate of Operational Capability in the MOD, and as Assistant Director (Operations) in the Air Staff, also within the MOD. Edward was Head of Joint Capability in the Security Policy and Operations area of the MOD until his appointment to Washington as the UK Chief of Defence Staff's Liaison Officer to the Chairman of the Joint Chiefs in Oct 2012. His military education includes advanced staff college in Canada in '99, the Higher Command and Staff Course in the UK in '06, the USAF's CFACC course at Maxwell AFB, and the Royal College of Defence Studies in '09. He completed an MA in International Relations at Kings College London in 2010 and undertook a Slessor Fellowship at Oxford University, researching Pol/Mil relations and strategy-making. Edward was appointed as the Assistant Chief of the Air Staff on 5 Apr 2013 and subsequently Assistant Chief of Defence Staff (Operations) on 20 March 2015. Awards include the MBE in 2000, the OBE in 2003, CBE in 2009 and CB in 2017. Edward is married to Louise, a GP in Yorkshire and have two children.

Paul Edward Strong is a historian and analyst in the UK's Defence Science and Technology Laboratory. He is a wargame practitioner at the Ministry of Defence - specialising in game design, scenario development, wargame adjudication and Red Teaming. He is the co-author of *Artillery in the Great War* (2011) and edited a volume on the changing role of women in warfare in the 20th Century (*Women in War: From Home Front to the Front Line*) in 2012. His most recent research has focused on the role of the Royal Navy's Western Approaches Tactical Unit during World War Two.

Brian Train has been designing conflict simulation games for the civilian market for over 20 years, with 45 published designs to date. His articles and games have been published by a wide range of large and small firms. His special interests in game design are irregular warfare, "pol-mil" games, concepts of political influence in games, and asymmetry in games generally. In his spare time, he is an Education Officer in the Ministry of Advanced Education of British Columbia, Canada.

Jim Wallman is a professional game designer specialising in manual games for developing insights, strategy and team development and for education, with over twenty five years' experience in the field. These wargame game designs are informed by many years as senior civil servant in the Ministry of Defence, as well as senior roles in the voluntary sector. He has designed and delivered map wargames at political, strategic and operational level for the UK Defence community; board games, map games and concept development games for the British Army; over 40 sets of wargaming rules; and command and decision games covering issues such as equipment development, political crises, strategic planning, and civil disorder. He has worked extensively with the corporate, public, educational, entertainment and voluntary sectors, in particular designing and implementing games for senior leadership development and analytical wargames for the UK MOD, corporate and the voluntary sector. Also a regular guest lecturer on wargame design and development at Wolverhampton University. His background and training is primarily in the social science, psychology and military history fields, with a particular interest in the practical application of positive psychology to game structures and the development of immersive gameplay. His game designs in the recreational arena have now been played world wide in the USA, Canada, Australia, the Netherlands, France, Italy, Germany, Austria and New Zealand as well across the UK.

George Wilson is a serving British Army officer currently employed as the Assistant Head of doctrine at the Development Concepts and Doctrine Centre. He is an infantry officer with 34 years of service. His career has been predominately spent on operations or training for operations worldwide. He has deployed operational experience in Europe, Africa and Asia. Most recently he has spent over 2 years in southern Afghanistan conducting operations covering both the surge (2009-10) and the drawdown (2012-13). In a previous appointment he commanded the Command and Staff Trainer (North) in Catterick, responsible for training Army organisations in the planning process, where he supervised the conduct and delivery of numerous wargames. In his current role he is responsible for the team who write and update the UK's joint doctrine.

Charles Vasey is a Chartered Accountant, Chartered Tax Advisor and fantasist. His gaming started in the Sixties with figure gaming inspired by Airfix and Donald Featherstone. In the Seventies he moved into boardgaming and, inspired by the insipid level of game reviewing, launched his own review magazine *Perfidious Albion* that ran for over 100 issues dedicated to celebrating representing historical accuracy in games. During that period, he was a game reviewer for, *inter alia*, *Military Modelling and Moves* (SPI) magazines. Not satisfied with beating up designers in print he has designed a number of games usually over ludicrously long time periods on subjects from the Fertile Crescent to British naval campaigns against the French 1793-1814. He assisted in the RCAT project. A dedicated follower of politics (horse racing without the betting) he has also designed a number of election games seeking to follow the patterns of British politics from 1964 to 2017. A similar interest in cycling has resulted in a game modelling the great European tours at the level of the *directeur sportif*. His interest in boxing has yet to yield ludic fruit.