

#### About Defence Technology Centres (DTCs)

Defence Technology Centres (DTCs) are virtual centres of excellence in broad technology areas. Participants see a return on their investment in science and technology through exploitation in future defence equipment and wider civilian applications. The strategic aim of DTCs is to provide more rapid pull-through of low technology maturity level research into the MoD's defence equipment programme. The Defence Technology Centre initiative is an exemplar for research collaboration between Government, UK Defence, Small-Medium Sized Enterprises and Universities. Industry provides MoD with a matching contribution in-kind – knowledge of their internally funded research.

Each DTC is tasked with achieving the following generic outcomes:

- generate knowledge, via research, appropriate to future UK Defence needs in the relevant domains
- enable earliest exploitation of knowledge generated for the benefit of UK Defence
- enable the knowledge generated to be used by MoD for internal UK government purposes
- enable knowledge generated in the civil sector to be used within the DTC
- enable the knowledge generated by the DTC to be exploited for the benefit of the civil sector

#### About the EMRS DTC Research Programme:

The EMRS DTC research programme has been created to address the following science and technology outcomes within Electro-Magnetic Remote Sensing:

- day and night, all weather capability
- long range operation
- rapid, large area search capability
- detection of low signature targets
- detection of camouflaged / concealed targets
- affordable, robust systems for military platforms
- covert operation
- multi-function / ID capability

The research programme is organised into four research themes: RF Systems, Electro-Optic Systems, Transduction Devices and Materials and Transducer Embedded Processing. For more information, see the EMRS DTC web site: [www.emrsdttc.com](http://www.emrsdttc.com).

#### About the SEAS DTC Research Programme:

The SEAS DTC research programme has been created to address the following science and technology outcomes within Autonomous Systems:

- high mission benefit which for information gathering includes discrimination between objects of interest and potential interference
- potential for meeting different mission needs (e.g. to be an information network node)
- increased ability to act without human intervention in a wider range of circumstances
- discrimination between objects of interest and potential interference
- improved speed and endurance
- reduced need for mission-control based communications
- moderately high survivability e.g. suitably low probability of detection in line with the application
- reduced logistics burden
- reduced system whole life costs and increased ease of upgrade
- safe operation (in particular when operating in conjunction with manned vehicles)
- increased public acceptability
- reduced operator workload and training needs e.g. ease of deployment, operation and recovery
- reduced need for mission-control based communications/improved management of communications (e.g. in reduced bandwidth)
- low total system whole life costs and ease of up-grade e.g. technology insertion, robustness to component/sub-system obsolescence, and high fuel efficiency

The research programme is organised into six research themes: Algorithms & Architectures, Mission Planning & Decision Making, Sensor Exploitation, Communications & Control, Propulsion, Power Generation and Energy Management and, Systems Engineering Research. For more information, see the SEAS DTC web site: [www.seasdtc.com](http://www.seasdtc.com).

#### The Joint SEAS-EMRS DTC Technical Conferences:

The SEAS and EMRS DTCs are holding unclassified technical conferences at which the work of the both DTCs will be disseminated. The technical conferences will be held at the Edinburgh International Conference Centre (EICC) on 7th-8th July 2009 and will run in parallel, sharing common ticketing and organisation. The event is being sponsored by Scottish Enterprise.

A joint Exhibition will be held on both days of the conferences and there will also be poster displays. Delegates will be able to move freely between conference sessions of the two conferences, choosing from approximately 80 technical papers, thus building their own programme from a mix of technical papers, posters, demonstrations and exhibits.

On the evening of Tuesday 7th July 2009 a networking reception will be held for all delegates in the Cromdale Hall of the EICC. The networking reception is being sponsored by BAE SYSTEMS. This will afford all delegates the opportunity to network with the broad community of interest that the DTCs have brought together. Following the networking reception there will be a conference dinner, available as a costed option, which will be held at "The Signet Library". Early booking is recommended for those delegates who want to attend the conference dinner, which is available in delegate packages "A" & "C" - see opposite. The conference dinner is being sponsored by SELEX Galileo. Delegate lunches on both days are being sponsored by the Aerospace and Defence KTN. Tea and Coffee breaks on day 1 are being sponsored by Roke Manor Research and day 2 by MBDA.

#### Who Should Attend?

The joint SEAS and EMRS DTC Technical conferences should be attended by:

- potential exploiters of DTC funded research
- potential providers of research to the DTC programmes
- members of the broad military and civil community of interest, including its underlying key technologies, systems and sub-systems

The conferences will provide potential bidders to the DTCs' respective calls for proposals with an opportunity to review the current programmes and discuss ideas for further research with both DTC management teams and scientists.

#### Registration and Booking Information:

Conference bookings are being organised on behalf of both DTCs by the EICC. The EICC team will take your registration, booking and payment. This can be made on line, by facsimile or by post on the booking form provided with this notice to:

Rachel Donald  
Joint EMRS/SEAS DTC Conference 2009  
EICC  
The Exchange tel: +44 (0) 131 519 4100  
Edinburgh fax: +44 (0) 131 300 3030  
EH3 8EE e-mail: [emrsdttc@eicc.co.uk](mailto:emrsdttc@eicc.co.uk)

Payment can be made by credit card. Please note that we can only accept bookings accompanied by payment.

#### Conference Fee:

The DTCs have created a number of delegate package types to allow us to meet individual delegate needs. Details of these packages and early booking discounts are below:

Package A (full package): Attend both conferences, exhibition, demonstrations, networking reception and conference dinner and receive both conference proceedings.

Package B: As package A, but not attending the conference dinner.

Package C (exhibitor's package): Attend the exhibition, demonstrations, networking reception and conference dinner.

Package D: As package C, but not attending the conference dinner.

Package E: Partner's ticket for conference dinner

Package	Book Before 27 March 2009	Book Before 8 May 2009	Book Before 19 June 2009
A	£435 incl VAT	£460 incl VAT	£490 incl VAT
B	£345 incl VAT	£375 incl VAT	£405 incl VAT
C	£205 incl VAT	£230 incl VAT	£260 incl VAT
D	£115 incl VAT	£115 incl VAT	£115 incl VAT
E	£90 incl VAT	£90 incl VAT	£90 incl VAT

#### Planning Your Trip

A comprehensive set of online resources, including information on accommodation, travel, map and visitor attractions is available at: [www.emrsdttc.com/conference/2009/conferences.html](http://www.emrsdttc.com/conference/2009/conferences.html)

Information on planning a holiday in Scotland is available as follows:

Visit Scotland: [www.visitscotland.com](http://www.visitscotland.com)  
E-mail enquiries: [info@visitscotland.com](mailto:info@visitscotland.com)

Edinburgh & Lothians Tourist Board: [www.edinburgh.org](http://www.edinburgh.org)  
Telephone helpline: +44 (0)845 225 5121

#### Conference Location:

The conference will be held at the Edinburgh International Conference Centre (EICC) which is located in the centre of Edinburgh. The main entrance of the EICC is on Morrison Street, served by a convenient drop-off point for cars, coaches and taxis. The EICC is just a short walk from Princes Street, Edinburgh Castle and the Royal Mile. There are several car parks close to the centre. The centre is also within walking distance of Haymarket train station. For further information on the venue, including a map see: [www.eicc.co.uk](http://www.eicc.co.uk)

#### Conference Sponsorship:

Our thanks to the following organisations who are sponsoring elements of this year's conference:

- Main conference sponsor: Scottish Enterprise
- Networking Reception: BAE Systems
- Conference Dinner: SELEX Galileo
- Lunches: Aerospace & Defence Knowledge Transfer Network
- Tea and Coffee Breaks (Day 1): Roke Manor Research
- Tea and Coffee Breaks (Day 2): MBDA UK

## A joint technical conference with the EMRS DTC

Sponsored by:

 Scottish Enterprise

 roke

Roke Manor Research Ltd  
a Siemens company

Aerospace  
& Defence

Knowledge Transfer Network

**BAE SYSTEMS**

**MBDA**  
MISSILE SYSTEMS

 SELEX GALILEO

# SEAS DTC

SYSTEM ENGINEERING FOR AUTONOMOUS SYSTEMS DEFENCE TECHNOLOGY CENTRE

## Annual Technical Conference & Exhibition

Edinburgh International Conference Centre  
Tuesday 7th & Wednesday 8th July 2009


SEAS DTC

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# Schedule for SEAS DTC Conference, 7th & 8th July 2009

## Day 1 – Tuesday 7th July 2009

Time	Kilsyth Stream		Moorfoot Stream		Tinto Stream	
08:00	Strathblane Hall: Registration / Cromdale Hall: Coffee					
09:10	Pentland Auditorium: Combined Welcome Session with EMRS DTC					
10:10	Brief break					
10:15	Pentland Auditorium: Plenary Session 1: SEAS DTC Introduction					
10:45	Cromdale Hall: Coffee / Tea / Exhibition (Sponsored by Roke Manor Research)					
11:10	<p><b>Kilsyth:</b> Session chair Stuart Farquhar (Dstl)</p>	<p><b>Communications and Control theme session, part 1</b></p> <ul style="list-style-type: none"> <li>• Theme introduction:</li> <li>• Theme papers:                             <ul style="list-style-type: none"> <li>– Architecture development for remote presence (Chris Sotzing, Heriot Watt University)</li> <li>– Self managed mobile cells (Eskindir Asmare, Imperial College)</li> <li>– Robust application-layer Knowledge Exchange (Andrew Smith, Imperial College)</li> <li>– Development and virtual network demonstration of future communication architecture (Andrew Dunlop, Roke)</li> </ul> </li> </ul>	<p><b>Moorfoot:</b> Session chair Bharat Patel (Dstl)</p>	<p><b>Systems Engineering research theme session, part 1</b></p> <ul style="list-style-type: none"> <li>• Theme introduction:</li> <li>• Theme papers:                             <ul style="list-style-type: none"> <li>– A case study in goal-driven architectural adaptation (Will Heaven, Imperial College)</li> <li>– Dynamic, cost-directed reconfiguration of multi-platform sensor architectures (Kevin Hammond, St Andrews University / Matthew Bolsover, Waterfall Solutions)</li> <li>– Trusted reasoning engine for autonomous systems with an interactive demonstrator (Hannu Rajaniemi, ThinkTank Maths)</li> <li>– Measuring Emergence in Cooperative Autonomy (Ingrida Valiusaityte, BAE Systems)</li> </ul> </li> </ul>	<p><b>Tinto:</b> Session chair Steve Hodder (Dstl)</p>	<p><b>Propulsion, Power Generation and Energy Management theme session, part 1</b></p> <ul style="list-style-type: none"> <li>• Theme introduction:</li> <li>• Theme papers:                             <ul style="list-style-type: none"> <li>– A scoping study into advanced materials for morphing UAV wing structures (Lorenzo Iannucci, Imperial College)</li> <li>– Very long duration propulsion systems - Phase 2 (Mark Husband, Rolls-Royce)</li> <li>– Ultra-compact intelligent electrical networks - Phase 2 (Armin Stranjak, Rolls-Royce / Mike Hook, Roke)</li> <li>– Investigation into the Interaction between Automatic and Autonomous Systems (Mike Hook, Roke)</li> </ul> </li> </ul>
12:50	Cromdale Hall: Lunch Break / Exhibition (Sponsored by the Aerospace and Defence Knowledge Transfer Network)					
13:35	Pentland Auditorium: Plenary Session 2					
14:15	Cromdale Hall: Coffee / Tea / Exhibition (Sponsored by Roke Manor Research)					
14:30	<p><b>Kilsyth:</b> Session chair Paul Webb (Roke )</p>	<p><b>Communications and Control theme session, part 2</b></p> <ul style="list-style-type: none"> <li>• Session introduction:</li> <li>• Theme papers:                             <ul style="list-style-type: none"> <li>– Passive urban surveillance using signals of opportunity: demonstrator build (Robert Whitehouse, Roke)</li> <li>– Video streaming (Vince Dobbin, Wireless Fibre Systems)</li> <li>– Emergency through-ground mobile communications system (Vince Dobbin, Wireless Fibre Systems)</li> <li>– Factors affecting surface wave propagation (Janice Hendry, Roke)</li> <li>– Verification of multi-carrier modulation scheme for shallow water acoustic communication (John Domokos, Roke)</li> </ul> </li> <li>• Mini-thread demonstrator updates:                             <ul style="list-style-type: none"> <li>– Integration demonstrator for theme control projects (Tom Richardson, University of Bristol)</li> <li>– Integration demonstrator for theme communication projects (Andrew Dunlop, Roke)</li> </ul> </li> </ul>	<p><b>Moorfoot:</b> Session chair Graham Watson (BAE Systems SEIC)</p>	<p><b>Systems Engineering research theme session, part 2</b></p> <ul style="list-style-type: none"> <li>• Session introduction:</li> <li>• Theme papers:                             <ul style="list-style-type: none"> <li>– The evaluation of cultural factors and their potential effects on military operations (Carys Siemieniuch, Loughborough University)</li> <li>– Deriving safety requirements for autonomous systems (Rob Alexander, University of York)</li> <li>– Modular assessment framework for autonomous systems using novel architectural representations (Glenn Callow, BAE Systems)</li> <li>– Decision maker evaluation framework (Gareth Rees, MBDA UK)</li> </ul> </li> </ul>	<p><b>Tinto:</b> Session chair Dave Morgan (Rolls-Royce)</p>	<p><b>Propulsion, Power Generation and Energy Management theme session, part 2</b></p> <ul style="list-style-type: none"> <li>• Session introduction:</li> <li>• Theme papers:                             <ul style="list-style-type: none"> <li>– Introduction (Martin Johnston, Rolls-Royce)</li> <li>– Requirements Study into Intelligent Power Management (Ben Morley, BAE Systems)</li> <li>– Intelligent Power Management for Autonomous UAV Systems (John Economou, Cranfield University)</li> <li>– Assessing the Benefits of Intelligent Power Management for Autonomous Vehicles (Andrew Gardner, QinetiQ)</li> <li>– Architectures for Vehicle Power Management (Mike Hook, Roke)</li> </ul> </li> </ul>
16:20	Cromdale Hall: Networking Reception (up to 1900) (Sponsored by BAE Systems) - followed by Conference Dinner (Sponsored by SELEX Galileo)					

## Day 2 – Wednesday 8th July 2009

Time	Kilsyth Stream		Moorfoot Stream		Tinto Stream	
08:45	<p><b>Kilsyth:</b> Session chair John Liddicoat (Dstl)</p>	<p><b>Sensor Exploitation theme session, part 1</b></p> <ul style="list-style-type: none"> <li>• Theme introduction:</li> <li>• Underpinning research:                             <ul style="list-style-type: none"> <li>– Efficient representation of multi-view data (Pier-Luigi Dragotti, Imperial College)</li> <li>– Novel statistical approaches to the quantitative combination of multiple edge detectors (Tania Stathaki, Imperial College)</li> <li>– Exchanging multi-level maps (Tom Cooper, QinetiQ)</li> <li>– Distributed knowledge (Michael Outhouse, Deep Vision)</li> </ul> </li> </ul>	<p><b>Moorfoot:</b></p>	<p><b>MoD Technology Management Workshop</b></p>	<p><b>Tinto:</b> Session chair Graham Sharples (Dstl)</p>	<p><b>Algorithms and Architectures theme session, part 1</b></p> <ul style="list-style-type: none"> <li>• Theme introduction:</li> <li>• Theme papers:                             <ul style="list-style-type: none"> <li>– An Approach to Spatio-Temporally Consistent Scene Classification in Urban Workspaces: An Overview (Ingmar Posner, P. Newman University of Oxford)</li> <li>– Towards Driveable Terrain Detection with Uncertain Terrain Geometry Estimates (Richard Brimble, BAE Systems, Advanced Technology Centre)</li> <li>– Evaluating cognitive architectures for collision avoidance on commercial robots (Adam Collins, BAE Systems, Advanced Technology Centre)</li> </ul> </li> </ul>
10:00	Cromdale Hall: Coffee / Tea / Exhibition (Sponsored by MBDA UK)					
10:25	Pentland Auditorium: Plenary Session 3					
11:05	Brief break					
11:10	<p><b>Kilsyth:</b> Session chair John Liddicoat (Dstl)</p>	<p><b>Sensor Exploitation theme session, part 2</b></p> <ul style="list-style-type: none"> <li>• Session introduction</li> <li>• 'TIGER' mini-thread contributions:                             <ul style="list-style-type: none"> <li>– Robust phase correlation methods for sub-pixel feature matching (Jian Guo Liu, Imperial College)</li> <li>– Distributed knowledge (Michael Outhouse, Deep Vision)</li> <li>– Image volume registration (Darren Myatt, Waterfall Solutions)</li> <li>– Exchanging multi-level maps (Tom Cooper, QinetiQ)</li> </ul> </li> </ul>	<p><b>Moorfoot:</b> Session chair Henry Tse (BAE Systems)</p>	<p><b>Mission Planning &amp; Decision-making theme session part 1</b></p> <ul style="list-style-type: none"> <li>• Theme introduction</li> <li>• Theme papers:                             <ul style="list-style-type: none"> <li>– Asset allocation and routing, with games and repair, under uncertainty (Berc Rustem, Imperial College)</li> <li>– Understanding the impact of machine technologies on human team cognition (Jo Thoms, BAE Systems)</li> </ul> </li> </ul>	<p><b>Tinto:</b> Session chair Graham Sharples (Dstl)</p>	<p><b>Algorithms and Architectures theme session, part 2</b></p> <ul style="list-style-type: none"> <li>• Session introduction</li> <li>• Theme papers:                             <ul style="list-style-type: none"> <li>– Relative SLAM (Gabe Sibley, P. Newman, University of Oxford)</li> <li>– SLAM with a Heterogeneous Prior Map (Simon Juller, University College London)</li> <li>– Towards a Taxonomy of Performance Metrics, Bounds and Tests for Tracking and SLAM Algorithms (James Revell, BAE Systems, Advanced Technology Centre)</li> </ul> </li> </ul>
12:25	Cromdale Hall: Lunch Break (Sponsored by the Aerospace and Defence Knowledge Transfer Network)					
13:10	<p><b>Kilsyth:</b> Session chair John Liddicoat (Dstl)</p>	<p><b>Sensor Exploitation theme session, part 3</b></p> <ul style="list-style-type: none"> <li>• Session introduction</li> <li>• Demonstrations - chosen from:                             <ul style="list-style-type: none"> <li>– Real-time monitoring of crowded unstructured video footage (Nick Carter, BAE Systems)</li> <li>– STARTLE - cued threat detection (Mike Hook, Roke)</li> <li>– Phase correlation methods (Jian Guo Liu, Imperial College)</li> <li>– Object recognition (Michael Outhouse, Deep Vision)</li> <li>– Image volume registration (Darren Myatt, Waterfall Solutions)</li> <li>– Dynamic, cost-directed reconfiguration of multi-platform sensor architectures (Kevin Hammond, St Andrews University)</li> </ul> </li> <li>• Discussion and further demonstration with researchers post-session</li> </ul>	<p><b>Moorfoot:</b> Session chair Bob Taylor (Dstl)</p>	<p><b>Mission Planning &amp; Decision-making theme session part 2</b></p> <ul style="list-style-type: none"> <li>• Session introduction:</li> <li>• Theme papers:                             <ul style="list-style-type: none"> <li>– Collaborative mechanism to manage large groups of autonomous systems (Rachid Hourizi, University of Bath)</li> <li>– Modelling team coordination in multi-agent planning (Nalan Gulpinar, University of Warwick)</li> </ul> </li> </ul>	<p><b>Tinto:</b> Session chair Hector Figueiredo (BAE Systems)</p>	<p><b>Algorithms and Architectures theme session, part 3</b></p> <ul style="list-style-type: none"> <li>• Session introduction:</li> <li>• Theme presentations:                             <ul style="list-style-type: none"> <li>– Efficient Planning for Adaptive Navigation (Arthur Richards, University of Bristol)</li> <li>– Control and Management of Autonomous Mobile Sensors using the Max-Sum Algorithm (Alex Rogers, University of Southampton)</li> </ul> </li> </ul>
14:00	Cromdale Hall: Coffee / Tea / Exhibition (Sponsored by MBDA UK)					
14:15	Strathblane Hall: Plenary Session 4 : Demonstrations					
16:00	Cromdale Hall: Coffee / Tea / Networking (Sponsored by MBDA UK)					