# Human and sociological aspects of capability

Fiona Cotter

Domain Leader

Human Dimension and Medical Sciences

DST Programme Office

# Aim

*Providing scientific and technologically based solutions to training, coaching, ethos, leadership, health of our Armed Forces and security personnel, as well as understanding influence, human sciences, and psychological approaches in military and security operations.*


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# Benefits

- Clear evidence to inform personnel policy on selection, recruitment, retention and reward
- Analysis, design and assessment of training systems
- Cutting edge health and medical treatments & strategies
- Exploitation of human sciences techniques and approaches on Operations
- Human components incorporated into procurement processes early


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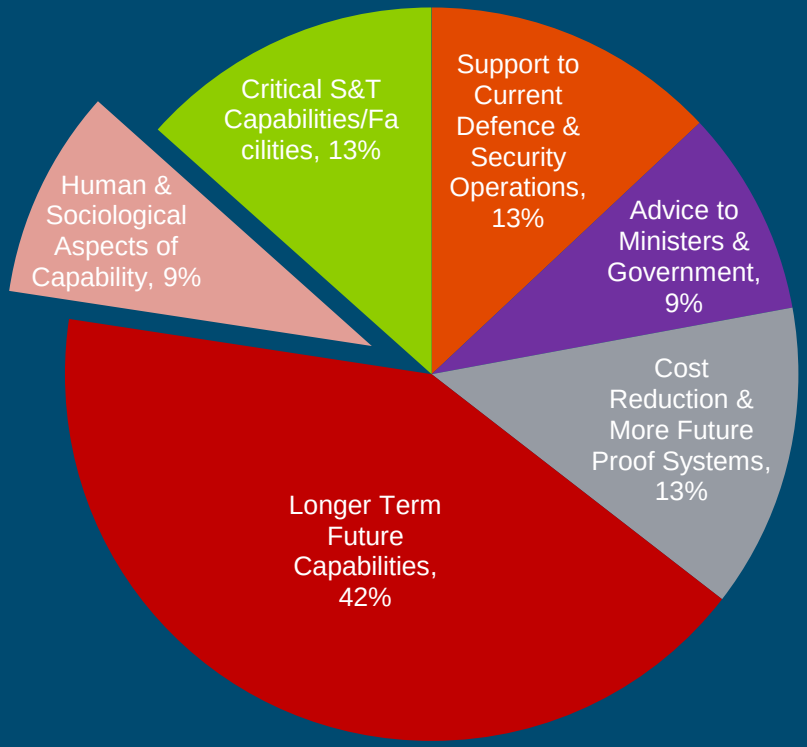
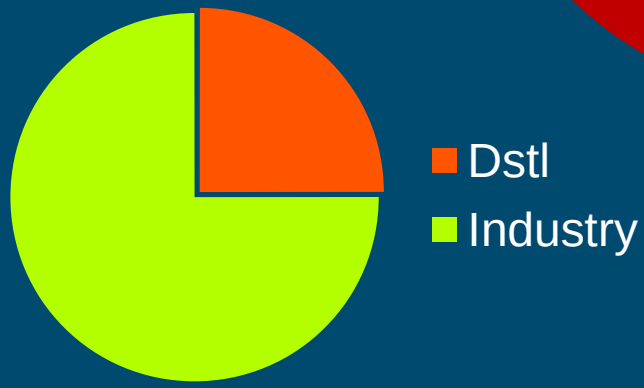
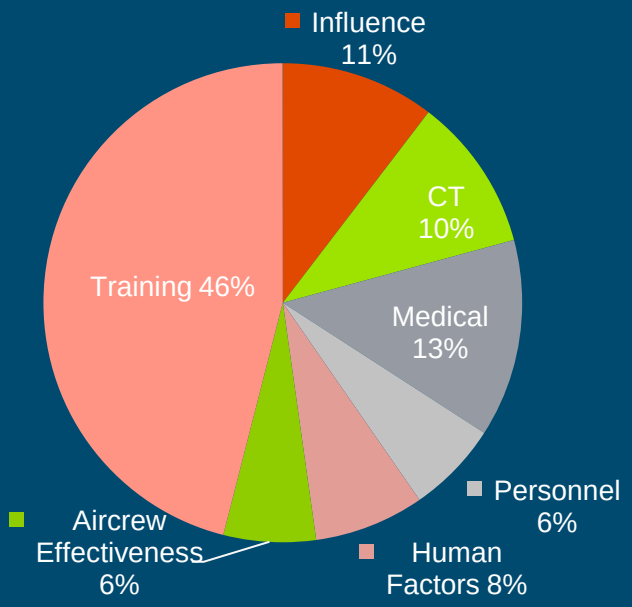
# Indicative Financial Breakdown




## Programme Balance



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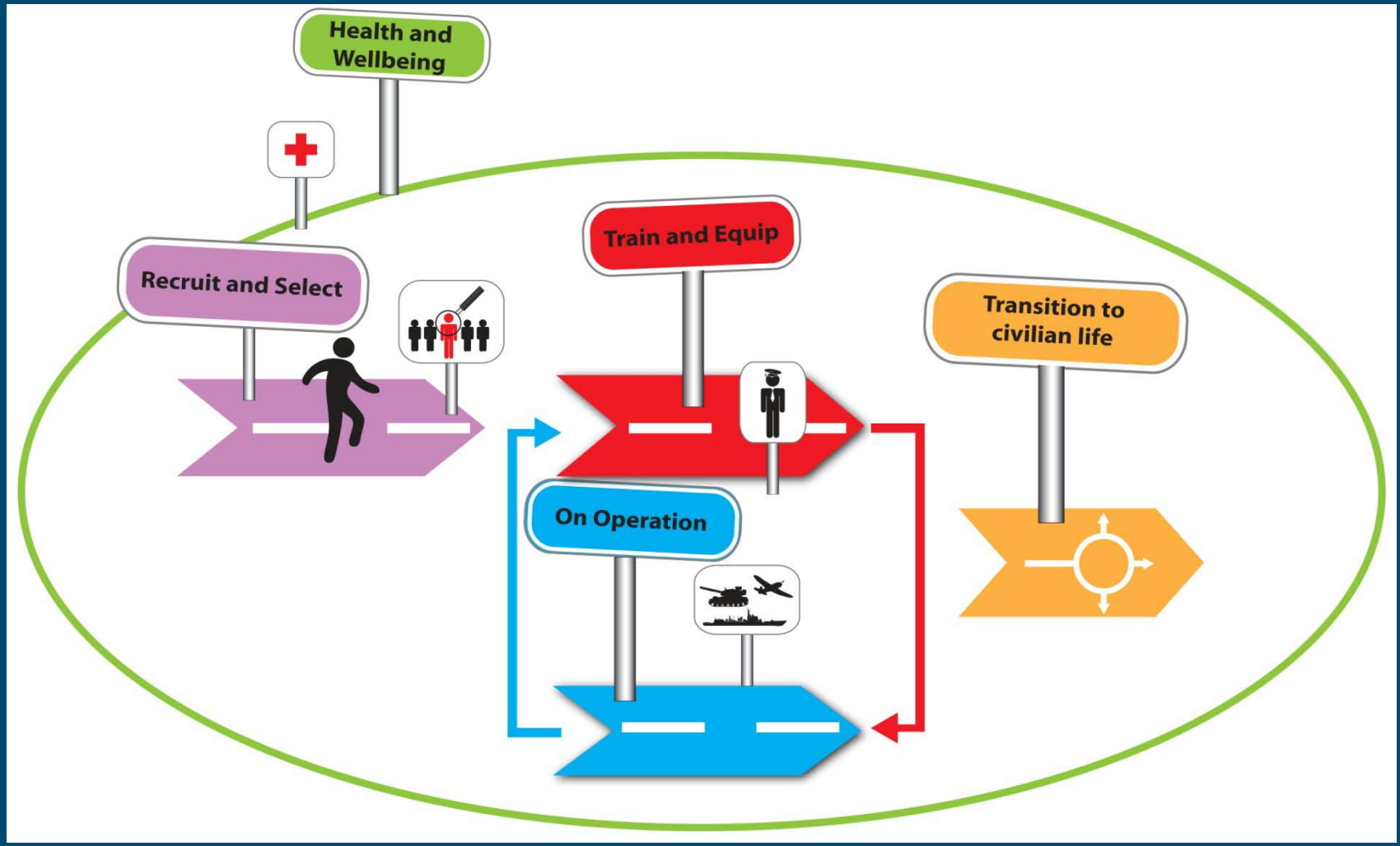
# Components





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# Recent Highlights

- EOD simulator for CIED training tasks
- Ballistic protection
- Gender engagement guidelines
- Driver skill fade
- New Employment Model


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# Challenges

- Supporting Future Force 2020 from the people perspective
- Ensuring COTS is useable within the military context
- Building a coherent training research programme
- Working with a wider stakeholders, including OGDs, research councils and charitable foundations
- Move from casualty care to rehabilitation
- Enabling the UK to achieve Defence and Security aims through influence


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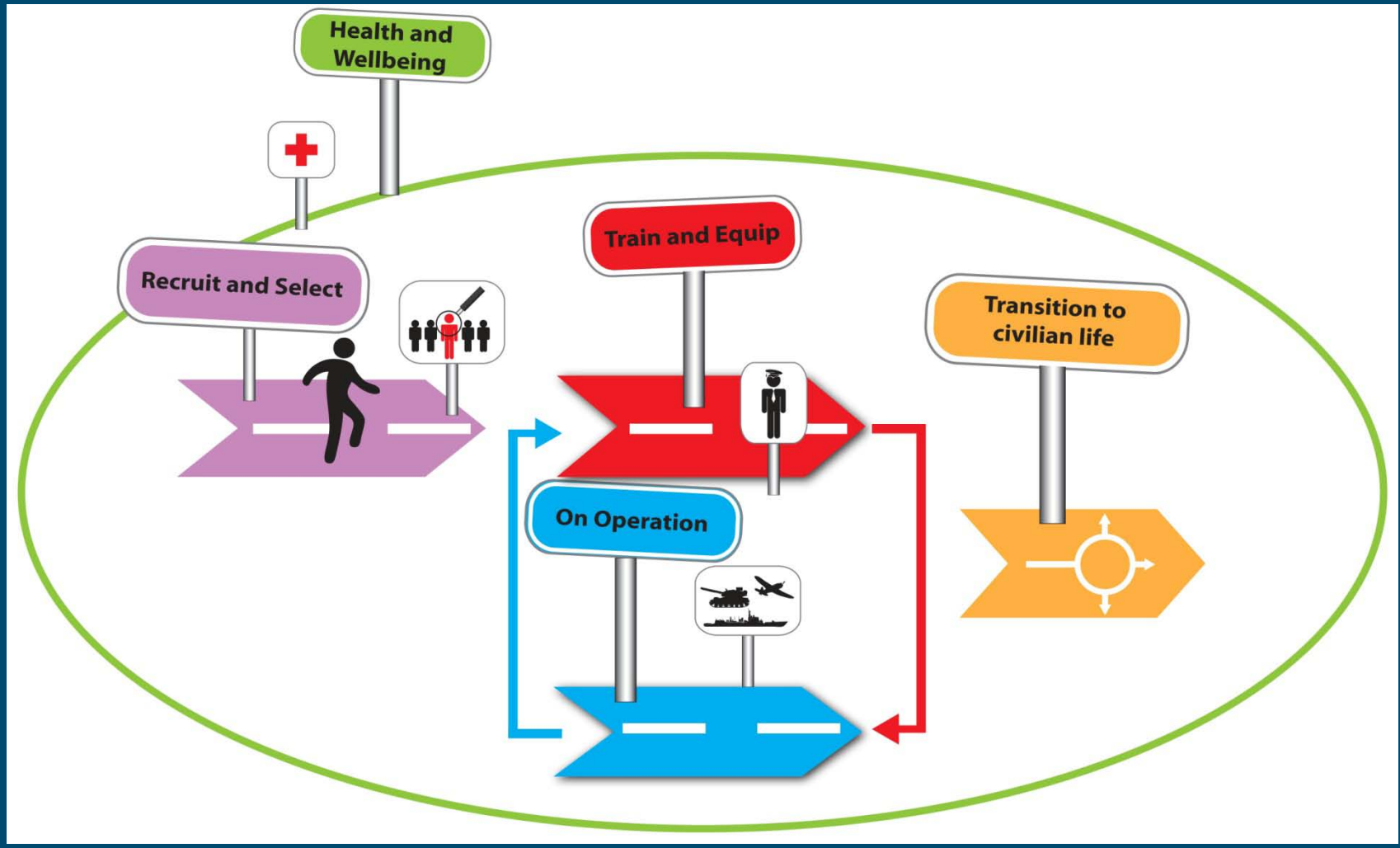
# Questions?





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# DHCSTC Supplier Engagement Event

## Training and Simulation Pipeline


Neil Smith
Programme Leader (Training & Education)
Strategy & Capability Domain
Dstl Programme Office
Tel: 02392 53 2527
Email: nsmith@dstl.gov.uk

Heather McIntyre
Capability Advisor Training
HD&MS Domain
Dstl Programme Office
Tel:
Email: hmmcintyre@dstl.gov.uk

Beejal Mistry
Training and Simulation Pipeline Lead
HD&MS Domain
Dstl Programme Office
Tel: 030 6770 3223
Email: bmistry@dstl.gov.uk

# Presentation Overview

1. Training and Simulation Pipeline brief
2. Cross cutting Human aspects of Training (Human Dimension & Medical Sciences Domain)
3. Test, Evaluation, Simulation and Training (TEST) Programme Overview (Strategy & Capability Domain)
4. Questions


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# Role of R&D Pipelines

- Provide a focus for sustained investment
- Coherent research aligned to address MOD's key challenges
- Heightened profile
  - Maintain critical skills
  - Encourage external investments in relevant capabilities
- Funded through MOD Chief Scientific Advisors Science & Technology Programme


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# Formation of Training and Simulation Pipeline

- MOD wishes to support Force Readiness with an effective and affordable Training system
- Heightened profile of Training and Simulation (Ref: White Paper: “National Security Through Technology”)
- Support to Defence Training Systems and Infrastructure (DTS&I) key principles:
  - Training is at the heart of Military Capability
  - Training systems are a critical enabler to Defence Training
  - Training systems should be flexible, adaptable, accessible


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# Training and Simulation Pipeline

- Accessing the optimum blend of training and education capabilities which is cost effective, rapidly and flexibly configurable.
- Underpinning S&T framework for Training and Education (T&E) Research
  - Enabling a coherent research programme
  - Increase understanding of the human response to training
  - Improving training outcomes
  - Exploitation of Off-The-Shelf (OTS) / innovative solutions to meet future training needs
  - Better delivery of joint training and interoperability with coalition partners or organisations (e.g. NATO, US, etc)


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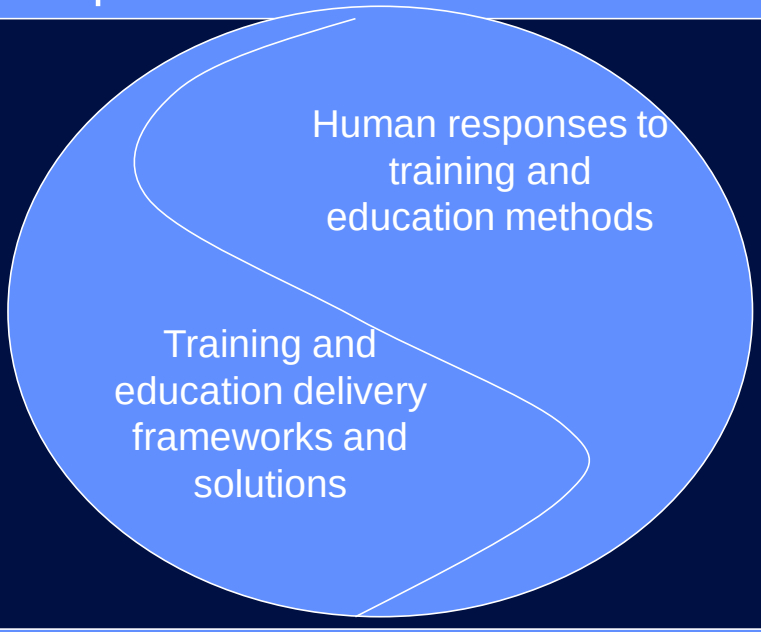
# Framework for the T & S Pipeline

Effective representation of training in Departmental HLOA and BoI Tools




Training Effectiveness Output Measures

MoD Capability Sponsor

JTES
Joint Training Evaluation Simulation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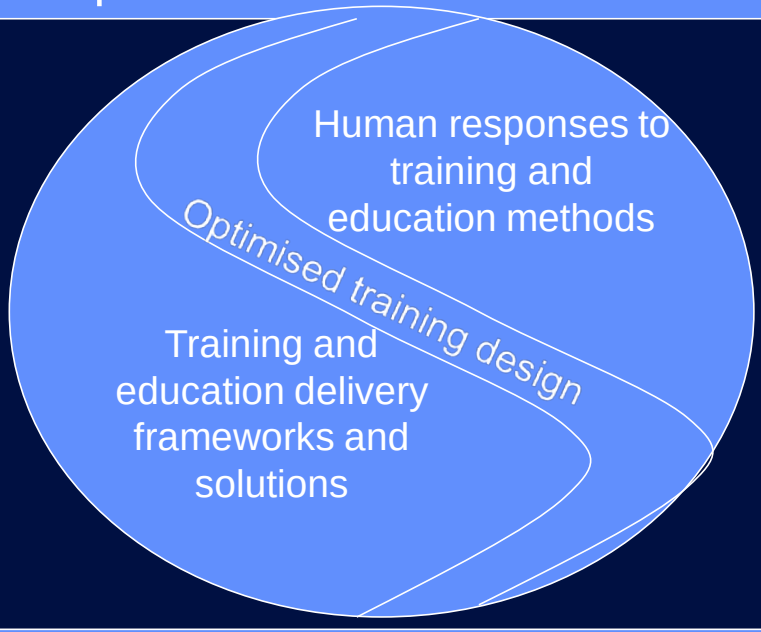
# Research Goals for the T & S Pipeline

Effective representation of training in Departmental HLOA and BoI Tools




Training Effectiveness Output Measures

MoD Capability Sponsor

JTES
Joint Training Evaluation Simulation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# Training and Simulation Pipeline

| Domain | Technical Area |
|---|---|
| Strat&Cap (TEST Programme) | • Optimise training HLOA and BoI tool development;<br>• LVC federated simulation architectures, interfaces and common components (tools, data, etc) evaluation;<br>• Technology demonstrators and experimentation to de-risk future requirements;<br>• Training Cost Model (TCM)<br>• Leveraging COTS technology and IRC developments |
| HD&MS | • Measurement, Methods and Metrics for Performance & Training<br>• Interventions for Developing and Preserving Performance – individual/team/collective<br>• Defence as a Learning Organisation |
| Air | • Inform the Defence Operational Training Capability in Air, DOTC(A)<br>• Optimise the live/synthetic balance in air/land/maritime environments<br>• Identify the cost-effective blend of live/synthetic flying hours<br>• UAS Training |
| Land | • Concepts to improve Land individual and collective training<br>• Cost effectiveness of training systems<br>• Optimising BoI in training and operating systems for Logs |


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# Training and Simulation Pipeline
## *Current activity*

- Focus and content of T&S Pipeline reviewed as part of FY13/14 programme formulation
  - Ensure coherency and alignment across Training Pipeline
- Programme governance will be refreshed in line with Defence Transformation
  - Current stakeholder Steering Groups are supporting FY13/14 programme formulation


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# Human Dimension & Medical Sciences Domain

## Training and Education Programme Overview

Heather McIntyre
Capability Advisor
HD&MS Domain
Defence Science & Technology Programme Office


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# Presentation Outline

- Programme Aim / Vision
- Research Priorities
- Summary


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# Programme Aim

- Identify and address human issues in Training and Education, covering individual, joint, collective and coalition training across the Services.


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# Programme Vision – Desired Outcomes

- Cost effective, integrated solutions to maximise availability and use of training capabilities
- Improved outcomes through optimised design
- True training costs captured and understood
- Reduced costs associated with training delivery
- Reduced environmental impact
- Increased flexibility in mechanisms to deliver joint, collective and combined training, including with Allies


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# Priorities for Research

- Three Research Areas
  - Measurement, methods & metrics for training
  - Interventions for developing & preserving performance – individual/team/collective
  - Defence as a learning organisation
- Timescales:
  - Current operations (2012-13);
  - Future Force 2020 (preparatory work by 2014; implementation by 2016).


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# Measurement, methods and metrics for performance and training

- Scope, develop and validate metrics and measurement methods for the delivery and assessment of training and education required for all types of operation.
- This will support  improved operational effectiveness as well as increased business efficiency/cost effectiveness.


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# Interventions for developing and preserving performance

- Develop the necessary structure to ensure delivery of an effective, appropriate and balanced training experience, which develops and preserves key skills for current and future operations.
- This will include understanding of skills and competencies required at the joint and collective (including multi-national) level


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# Education, and Defence as a Learning Organisation

- Improve understanding of, and how to optimise the links between, the wider development of an individual and the place of learning within the Organisation.


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# Summary

Defence Human Capability Science & Technology Centre

- HD&MS Training & Education research will be procured predominantly through the DHC STC

- The volume of requirements is expected to be in the region of £2.0-2.5M in FY13-14
- Programme will form part of the Training & Simulation R&D Pipeline
- Currently in the process of formulating research questions with Stakeholders


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# Strategy and Capability Domain
## Test, Evaluation, Simulation and Training (TEST) Programme Overview

Neil Smith
Programme Leader
Strategy & Capability Domain
Defence Science & Technology Programme Office


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# Presentation Outline

- Programme Aim / Vision
- Links with other Domains
  - re: Training & Education Programme
- Research Priorities
- Programme Overview
- Procurement Strategy
- Summary


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# Programme Aim

- Inform more cost-effective solutions for Joint Training, Concept Development Experimentation, pre-deployment exercises, Test and Evaluation to enhance current and future operations


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# Programme Vision

- Effective and efficient use of simulation infrastructure and services for analysis and experimentation through to test and evaluation, training and mission preparation
- Combined Operational (Live), Simulation (Virtual/Constructive) and C2 systems
- Simulation component re-use is the 'norm'
- An affordable, integrated Defence Evaluation and Training Estate

***Working closely with industry and academia to inform requirements for common simulation infrastructure and services to ensure the interoperability, cost effectiveness and utility of MoD's simulation investments***


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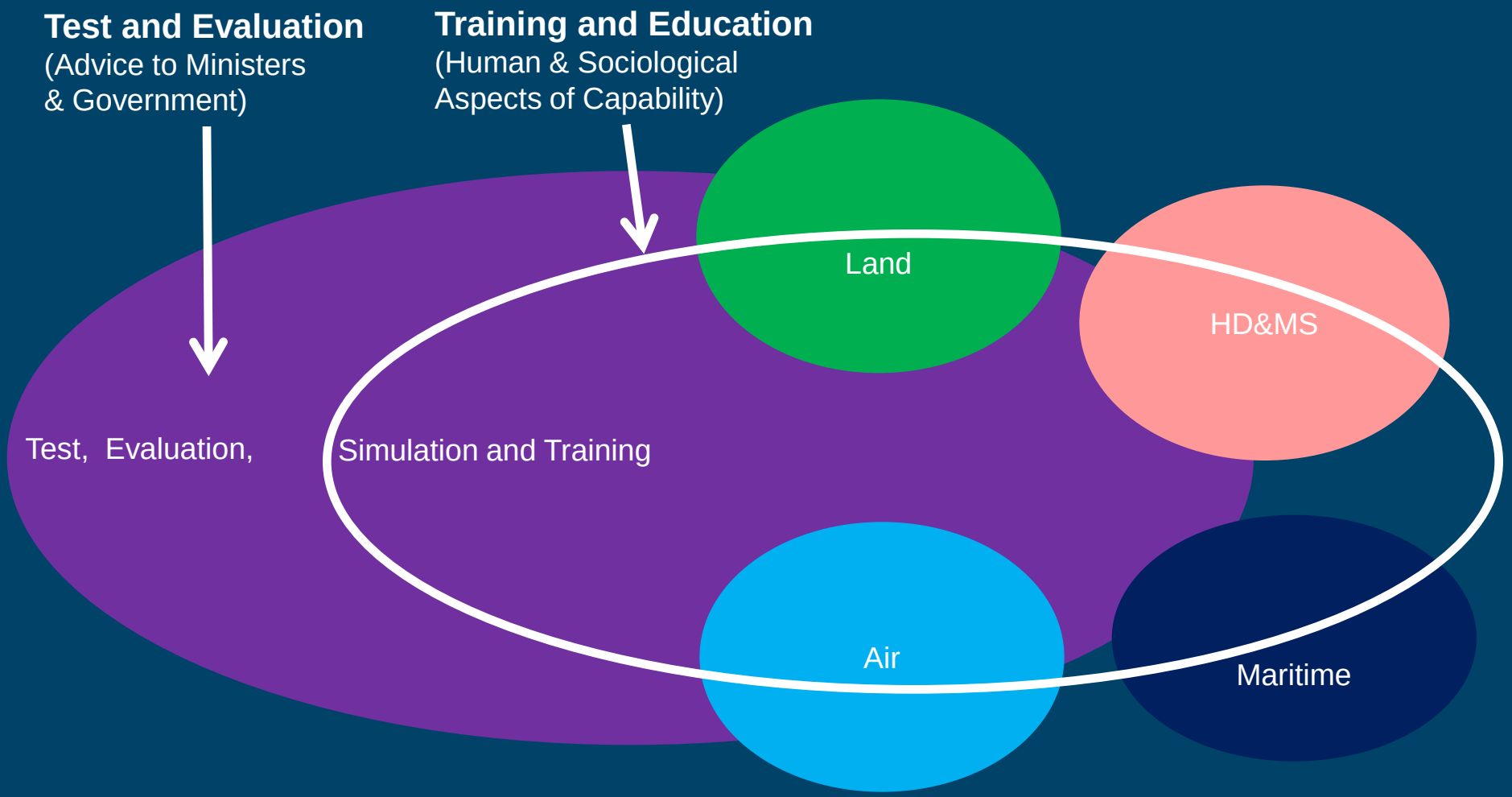
# Links with other Research Domains





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# Priorities for Research

## *Simulation and Training*

- Technical advice & demonstration to inform simulation strategy & policy
  - Cost effective use of current and emerging technology
  - Simulation Interoperability
  - ‘Component’ re-use
  - Experimentation

- Provide evidence to help maximise the effectiveness & efficiency of simulation & training
  - Live/Virtual/Constructive Simulation


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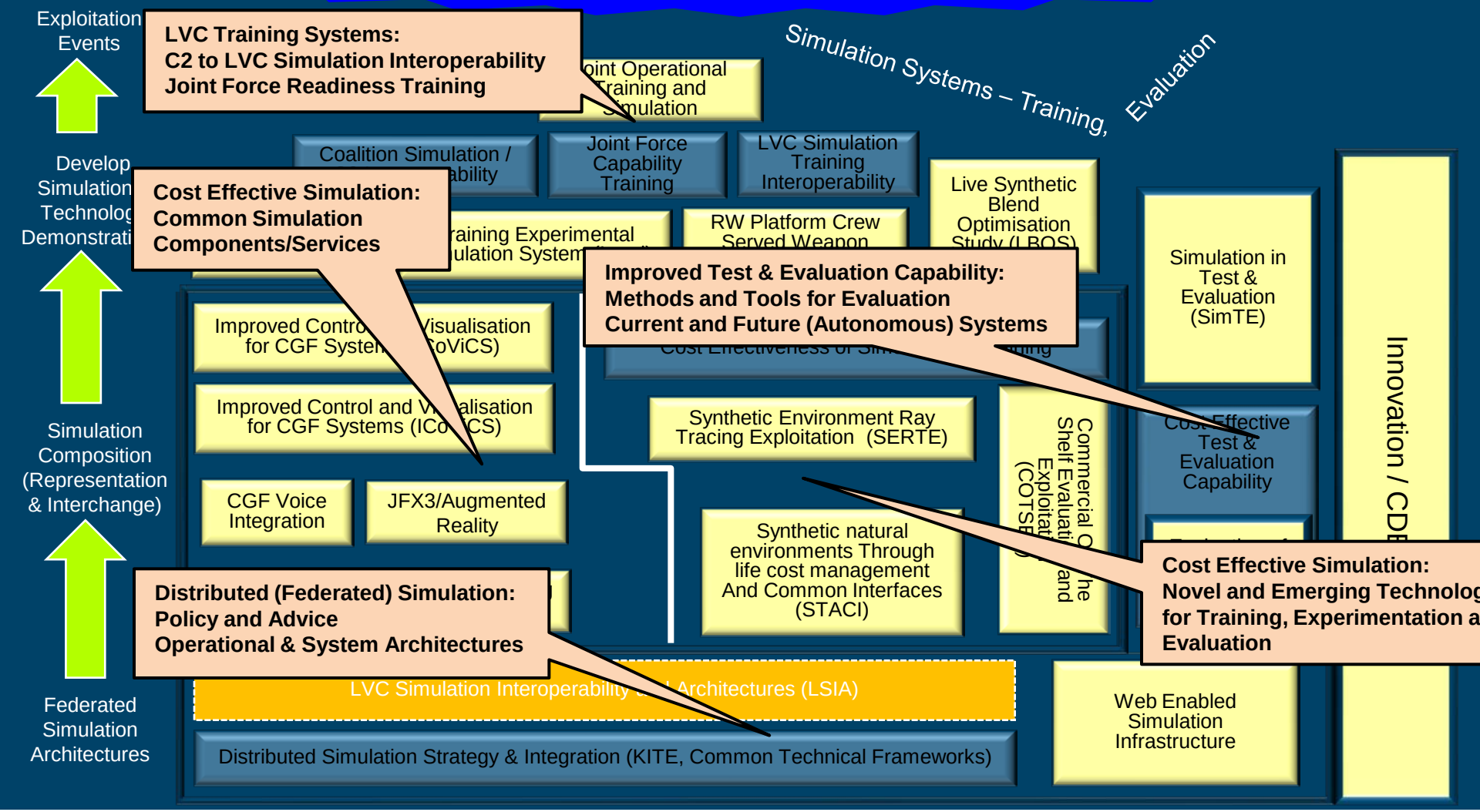
# Test, Evaluation, Simulation & Training

JTES | DTEC / pDSC | Service Commands | JFC | DE&S



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# Technology Demonstrators

- De-risking requirements for training systems
- Utilising COTS components
- Opportunity for cost savings as live training is partially replaced

Off-shore Raiding Craft (ORC)

Joint Helicopter Command crew-served weapon

Training Experimental Simulation System (Land)


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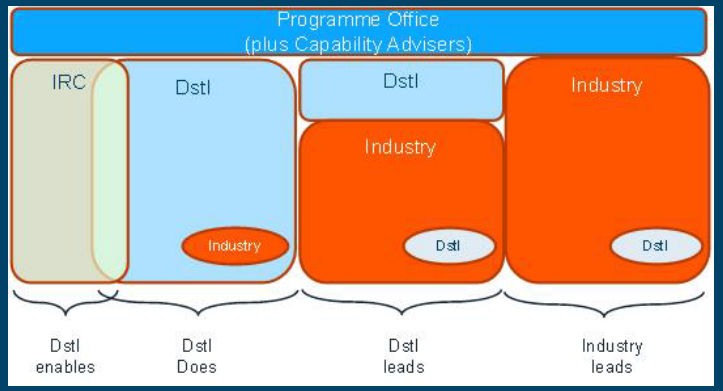
# Procurement Strategy

- Dstl
  - 24%
  - International Collaboration, Sensitivity, Impartiality, Coherence, Knowledge, Efficiency
- External Engagement
  - 76%
  - Directly via SE Tower (~61%)
    - 40+ organisations, including Small Medium Enterprises (SMEs)
  - Indirectly via Dstl (~15%)
  - Centre for Defence Enterprise
    - "Novel Methods for Training & Evaluation" (Oct 2012)




- Other (relevant) Consortia / Frameworks, e.g.
  - Defence Human Capability Science and Technology Centre (DHSTC)
  - Niteworks
  - UAS Capability Development Centre (CDC)
  - Simulation & Synthetic Environments National Technical Committee
  - Simulation Interoperability Standards Organisation (SISO)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# Summary

- Majority of programme will continue to be delivered by external suppliers
- SE Tower refresh options being considered
  - Consultation with SE Tower members
  - Maintain a Community of Practice
  - Establish 3 Technical Columns
    - Underpinned by 1 or more contracts
    - (First) ITT to be issued this FY
    - 3+ year duration
- Programme will form part of the Training & Simulation R&D Pipeline
- CDE Call ("Novel Methods for Simulation and Evaluation")
  - Presentation Event (18/10/12)
  - Webinar Event(31/10/12)


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# Human Factors Integration

Capability Adviser HFI

DHCSTC Supplier Day 5th Nov 2012


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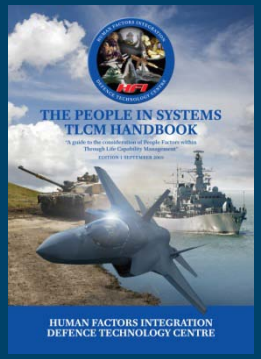
# Scope of HFI Research

HFI Policy & Process/ TLCM




Training

Support to Operations

Combat Readiness

Command & Control



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# Examples of completed HFI Research

- Human Component within test , evaluation & acceptance
- Enhancing Brigade Handovers/ Takeovers
- Technology for IED search & disposal
- HFI & safety within the System of Systems Approach (SOSA)
- Review of COTS 3D display technologies
- Evaluation of new imaging technologies to support decision-making
- Review of DEF STAN 0025 Part 14 'way ahead'
- Vibration & duty of care (scoping study)
- Human Factors issues related to the use of UXVs UAS information presentation
- Contemporising the Combat Estimate


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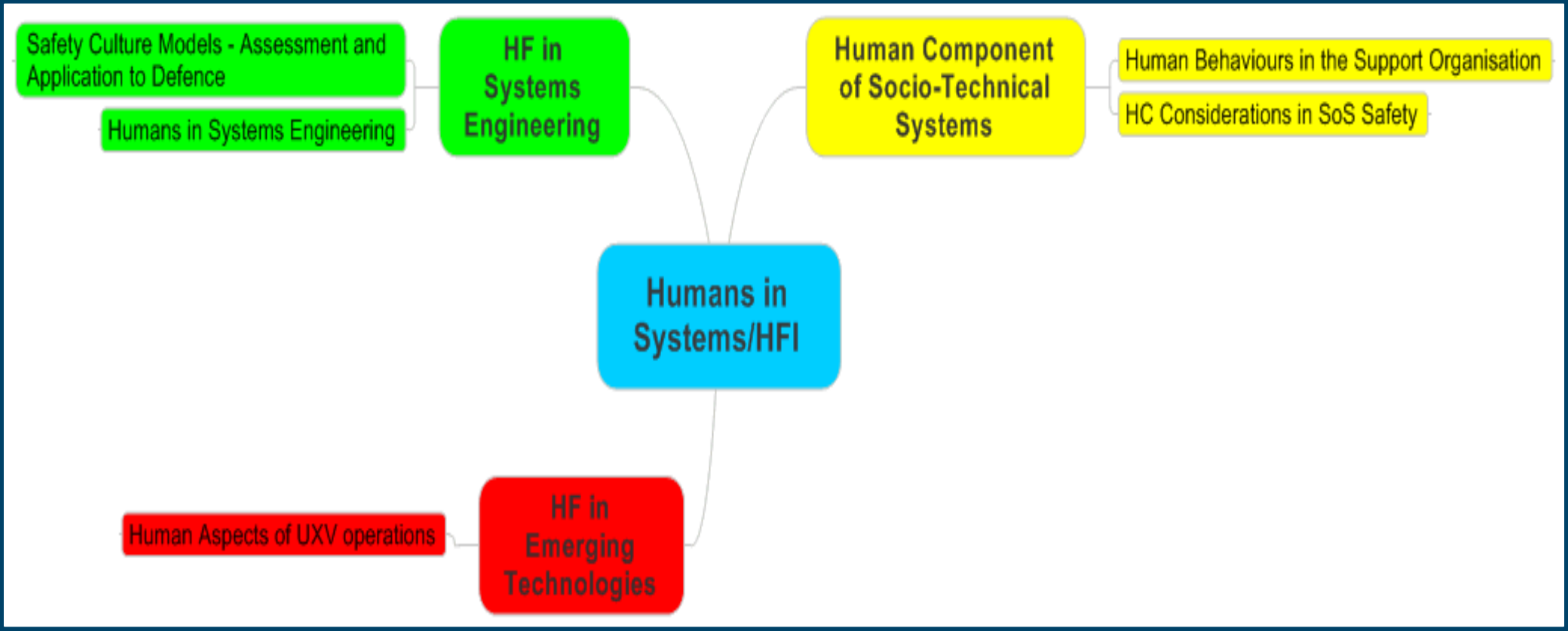
# Current DHCSTC HFI Programme




Programme priorities determined and endorsed by the Human Capability Steering Group (HCSG)



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# Impact of HFI research

- Informing policy: DEFSTAN 00-250, JSP 912
- Development of guidance material/publications: e.g. HFI on the AOF, People in Systems TLCM Handbook
- Exploitation into DE&S Project Teams
  - Observations on the usability of ComBAT
  - Training simulator for CUTLASS
- Exploitation into Front Line Commands
  - Collective Training Needs Analysis for Carrier Strike
  - Inclusion of ‘soft effects’ in the Combat Estimate process


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# HFI Priorities & Drivers (examples)

Focused on the Human Component of capabilities :

- Use of COTS products & emerging technologies
  - 3D displays
  - Hand-held devices
  - Novel interfaces
- Safety in ‘Systems of Systems’
- Autonomous systems/Unmanned vehicles
- Augmented human performance (linked to Dstl’s DIET programme)


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# Insights

- Distribution of tools and techniques developed
- Production of documentation/on-line resources
- Exploitation of links to DE&S industry programmes
- Enhancement of innovation by combining academia/industry (including SMEs)
- Overcoming inertia at ‘start-up’
- Ensuring responsiveness to meet UOR timelines
- Factoring in MoD ethical approval


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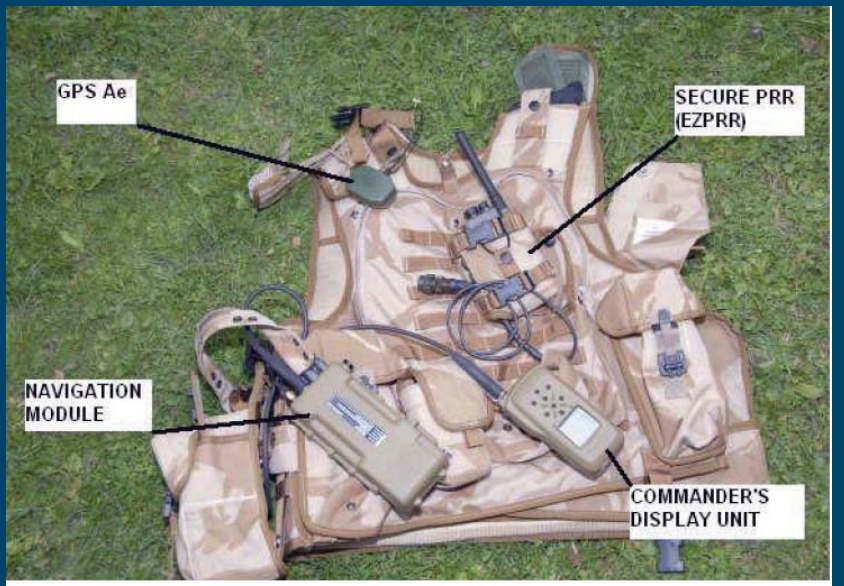
# Avoiding….





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# Personnel Research

Elizabeth Edgar, Science Gateway

Dstl HD&MS Domain Supplier Day, Nov 2012

# Key Driver

- ‘Support to the sustainable delivery of **sufficient, capable** and **motivated** personnel able to achieve success on current and future operations’ .

2011 Service Personnel Strategy




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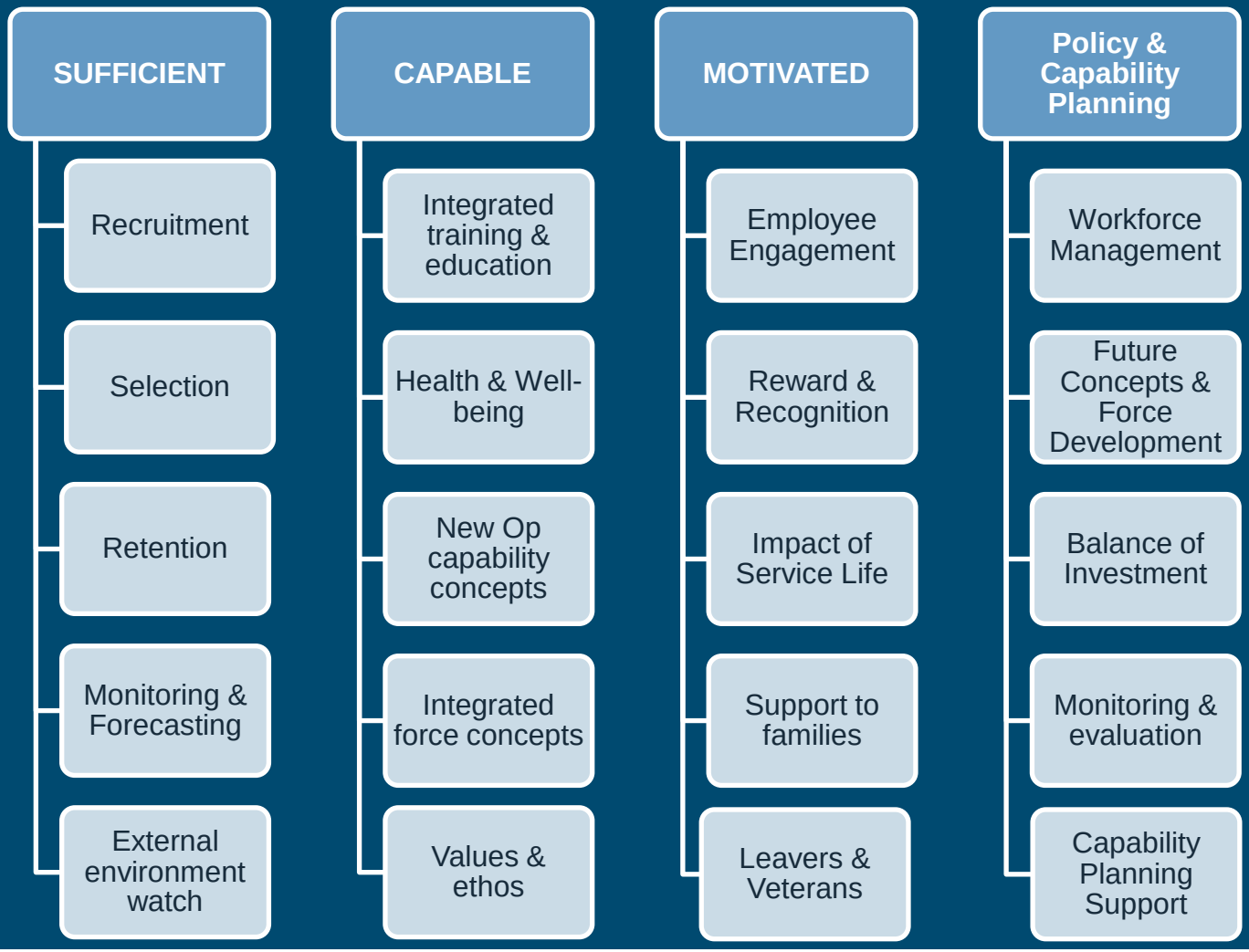
# Scope of Personnel Research

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# Examples of Previous Personnel Research

What attracts and inhibits the recruitment of ethnic minorities?

Why do stayers stay?

How can we draw together reliable costs for personnel to inform balance of investment decisions?

Will certain nutritional elements protect and sustain recovery rate?

What are the training requirements for casualty notification officers?

What questions should we use to capture the experiences of veterans as they embark on their civilian lives?

What gains may the US Battlemind system provide against the standard deployment debrief currently employed?

How does the welfare support provided to families compare with that of other organisations?


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# Generation and Ownership

- Priorities generated by SPRPG (May/Jun)
- Reviewed by SPWG (Jul)
- Endorsed by SPB (Sept)
- Represented at Domain Board (Oct); Exec Board (Oct)
- Represented at Customer Board (Oct 12); R&DB (Nov)

SPRPG = Service Personnel Research Programme Group
SPWG = 1* Service Personnel Working Group
SPB = 3* Service Personnel Board


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# Personnel Research Priorities 2013-14+

| FY13-14 |
| --- |
| New Employment Model |
| HUMAN CAPITAL |
| FUTURE FORCE 20<br>(ARMY2020/ Future Reserves 20/ Strategic Defence & Security Review/ Whole Force Concept) |
| HEALTH & WELL-BEING |
| COVENANT, VETERANS & FAMILY SUPPORT |


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# Personnel Research Priorities – Programme check

| FY12-13 | FY13-14 |
|---|---|
| New Employment Model | New Employment Model |
| HUMAN CAPITAL | HUMAN CAPITAL |
| Whole Force Concept | FUTURE FORCE 20<br>(ARMY2020/ FR20/ SDSR/ WFC) |
| HEALTH & WELL-BEING | HEALTH & WELL-BEING |
| COVENANT | COVENANT, VETERANS & FAMILY SUPPORT |


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# Programme Elements 12-13+ (1)

Ongoing from previous year

| RESEARCH THEMES | Time 2012-13+ ⟶ 2016+ |
|---|---|
| | X X X X |
| NEM | Judgement panel/Expert support |
| | NEM evaluation: Benefits realisation methodology ⟶ |
| | Impact of financial retention incentives |
| HUMAN CAPITAL | Personnel costs – to support BOI |
| | Generating and retaining talent: defining talent in the defence context |
| | Diversity 1: Current thinking in optimising diversity |
| | Diversity 2: Understanding diversity in the cadet forces |
| | Diversity 3: Pathways to leadership: barriers and opportunities |
| | Workforce Intelligence: Requirement specification |
| | Personnel HLOA supporting capability planning |
| | Personnel Resilience 1: Defining resilience and sustaining |

# Programme Elements 12-13+ (2)

| RESEARCH THEMES | Time 2012-13+ | | | 2016+ |
|---|---|---|---|---|
| | X | X | X | X |
| WFC | | WFC: Research Roadmap | | |
| | | FR20/DMS: Partnering for Talent – NHS Employers Study | | |
| HEALTH & WELL-BEING | Longitudinal cancer Study | | | |
| | | Vibration/Noise: Scoping studies | | |
| | | Alcohol: Research Roadmap | | |
| | | Personnel Resilience 2: Evaluation of Stress Interventions | | |
| COVENANT | Leavers, veterans transition pilot study | | | |

# Personnel Research Priorities 2013-14+
# Proposed programme elements

| FY13-14 | |
|---|---|
| NEM | •Impact of NEM on Front Line Commands<br>•Evaluation of NEM<br>• NEM & Defence transformation impacts<br>•Sustaining moral component<br>•Communication to support employee engagement |


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| FY13-14 | |
|---|---|
| HUMAN CAPITAL | • Career progression – Barriers and motivation<br>• Diversity<br>•Supporting HC component of defence planning<br>• Impacts of Service Life<br>•Optimising recruiting<br>• Integrated recruitment & retention<br>•Workforce Intelligence |


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| FY13-14 | |
|---|---|
| FUTURE FORCE 20<br>(ARMY 2020 FR20/SDSR/WFC) | •Army 2020 (Career Structures; career Support; Training and Education<br>•SDSR (2015; 2020)<br>•FR20 - Employer support<br>•Whole Force Concept |
| HEALTH & WELL-BEING | •Longitudinal cohort study on mental health impacts;<br>•role of the family in H&W of Service Personnel;<br>•Health and well-being of leavers<br>•Stress and remote operators<br>•Alcohol<br>•Stigma and mental health |
| COVENANT, VETERANS & FAMILY SUPPORT | •Family research - families of injured; deployed & geographically dispersed personnel |


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# Impact of Personnel Research

- Policy driven by evidence
- Enhanced practices
- Targeted interventions
- New understanding



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# Insights

- Diverse topics
- Broad stakeholder community
- Internal expertise
- Area of increasing focus
- Organisational change
- Need for flexibility



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# Key Driver

- ‘Support to the sustainable delivery of **sufficient, capable** and **motivated** personnel able to achieve success on current and future operations’

2011 Service Personnel Strategy


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# Maritime Human Factors

Capability Adviser HFI

DHCSTC Supplier Day 5th Nov 2012


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# Scope of Maritime HF Research

All aspects of human contribution to maritime system performance

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# Examples of completed Maritime Research

- Enhancements to the Complement Generation Tool (CGT)
- Development of a 'core' complement for Mine counter-measures, Hydrography & Patrol Capability (MHPC)
- Development of 'SubSafe'
- Development of the Team and Collective TNA (TCTNA) methodology – application to Carrier Strike
- Comparison of TCNTA & Mission Essential Competencies (MECs)
- Requirements definition in support of Maritime Synthetic Training Phase 2
- Potential skill fade in Anti-Submarine Warfare (ASW) capability
- Evaluation to tools to support the design of command spaces


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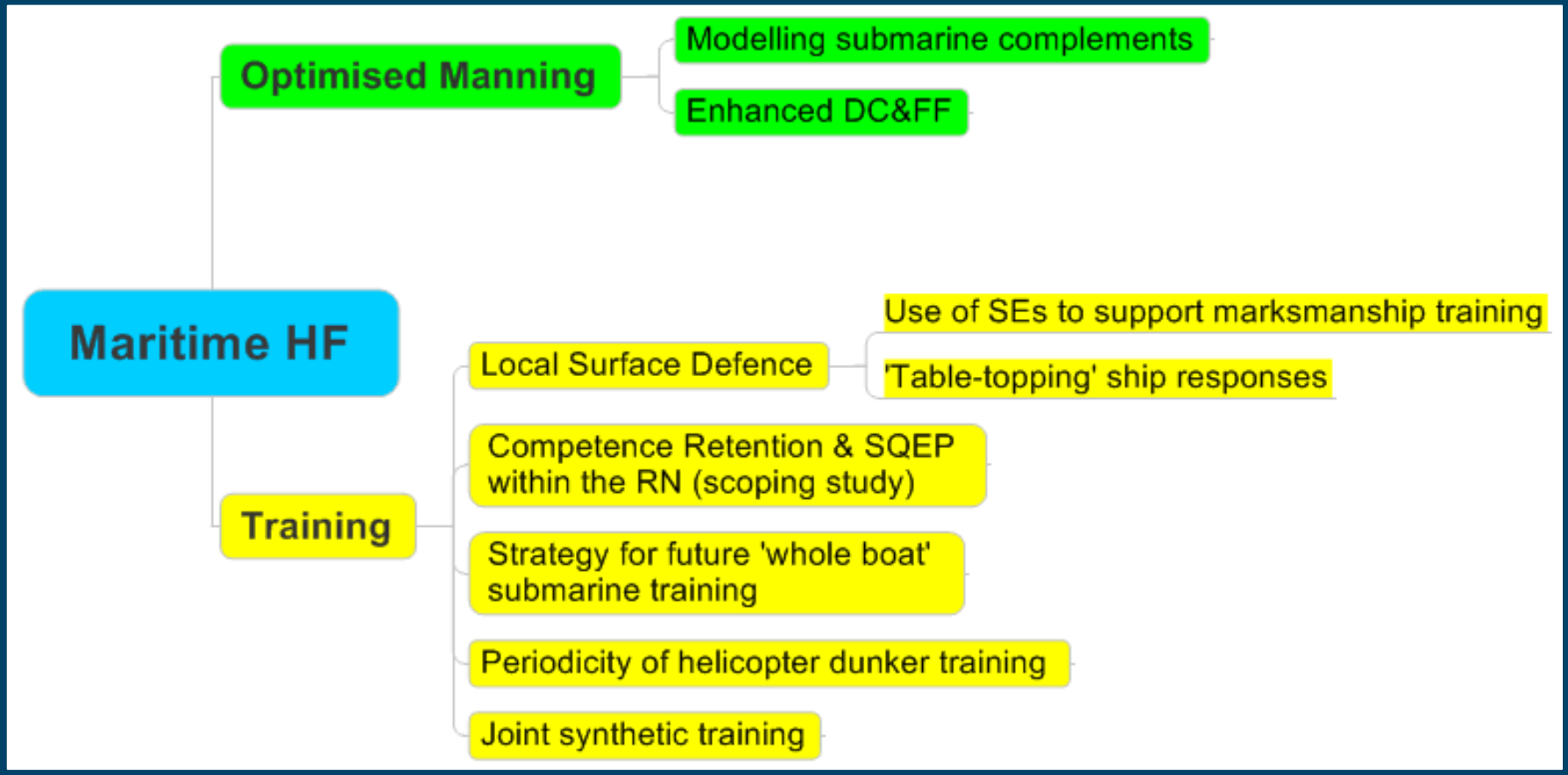
# Current Maritime HF Programme

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# Small Arms and Whole Ship Training

- Background
  - Limited opportunity for whole ship & individual marksmanship training
  - Focus on training to operate safely against the small boat threat
  - Variability in training experience resulting in differences in performance
- Requirement
  - *Research is required to improve RN & RFA'S ability to counter Fast Inshore Attack Craft (FIAC), to provide advice on Maritime Synthetic Training to improve the versatility of Maritime Training against current threats; including addressing the optimum live / synthetic balance and quantifying benefits and constraints associated with changes to the current training*

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# Context – What are the issues?

- Limited opportunity to hone marksmanship skills
- Separate geographical locations onboard
- Difficult environmental conditions, pitch/roll, wind
- Limited common reference points in local envr.
- No unified viewpoint of external environment
- Limited communication systems
- Lack of feedback for C2 regarding effect
- Optimal use of visual information?

**How do we train personnel to perform effectively under these circumstances?**

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# Small Arms and Whole Ship Training – Technical Approach

- Novel methods of training individual marksmanship
- Synthetic technologies for delivering collective co-ordinated self defence
- Metrics for assessing individual and collective performance
- Development of co-ordinated self defence synthetic environment research and training tool


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# Small Arms and Whole Ship Training – Progress

- Collaborative work:
  - Dstl Human Systems Group
  - Exeter University: Sports and Health Sciences Department
- SE is being contracted separately, currently out to tender with expectation that contract will be awarded early November
- MoDREC protocol in development: Principal Investigators from Dstl & Exeter University
- Trial expected to run March-April 2013

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# Impact of Maritime HF research

- Informing policy: JSP 822
- Exploitation into DE&S Project Teams
  - Contributing to development of a design guide for command spaces
  - Supporting development of requirements for Maritime Synthetic Training (MaST) Phase 2
  - Informing complementing decisions for T26 and MHPC
- Exploitation into the Royal Navy (FOST)
  - Collective Training Needs Analysis for Carrier Strike
  - Use of ‘SubSafe’ to enhance initial submariner training
  - Utilisation of ‘on-board’ capability to enhance training


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# Maritime HF Priorities & Drivers (examples)

- Affordability of future platforms
- Enhanced use of synthetic training
- Mitigating skill fade and provision of SQEP personnel
- ‘Getting more out of existing systems’ – enhancing the human contribution to overall system performance
- Increased use of Uninhabited Vehicles
- Address key shortfalls identified in capability audits

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# Influence and Stabilisation Programme Requirements

## Defence Human Capabilities STC Suppliers' Day

Dr Oliver Lanning

S&T Advice Team

Dstl Cyber & Influence S&T Centre

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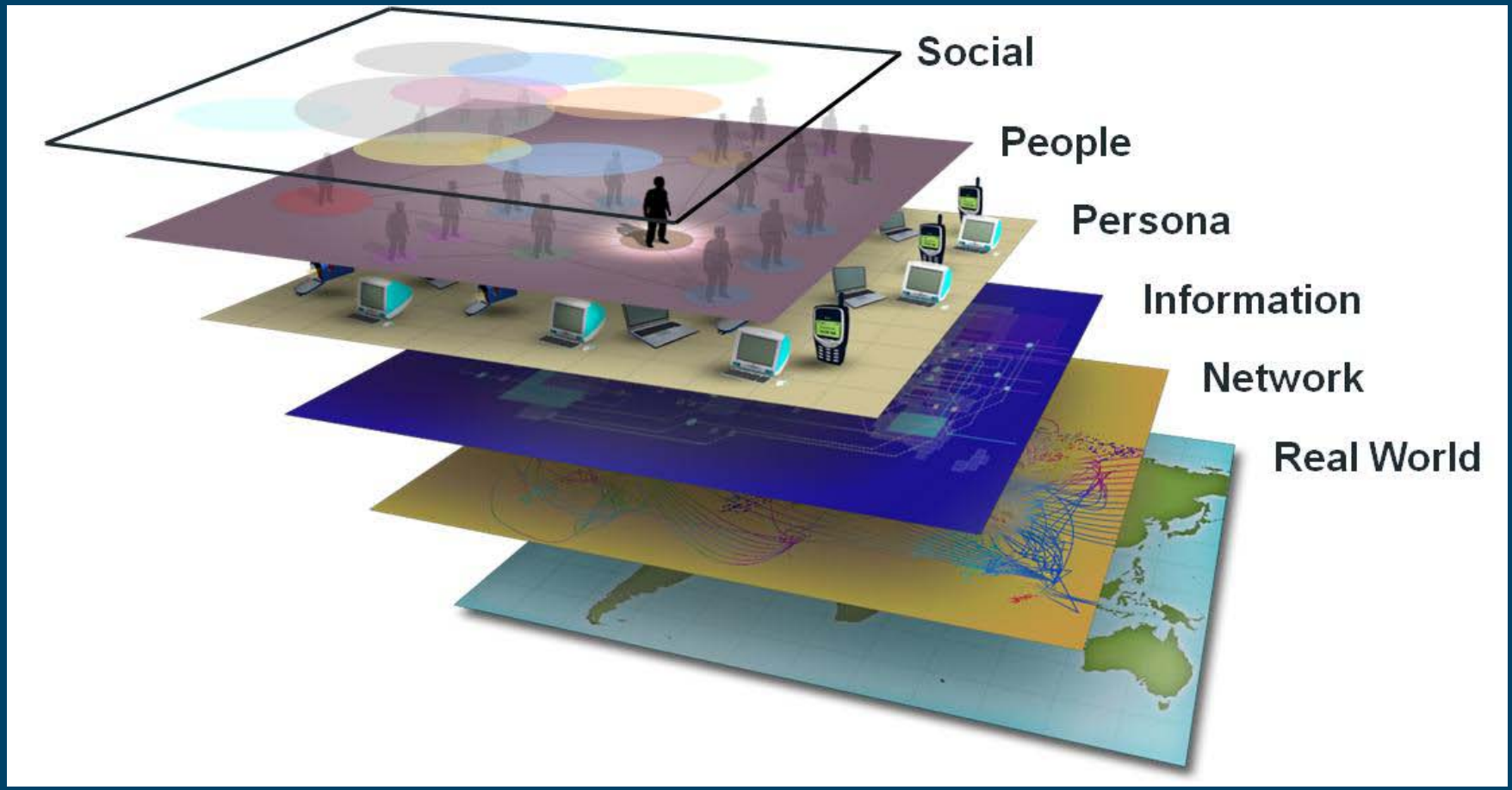
# Our space

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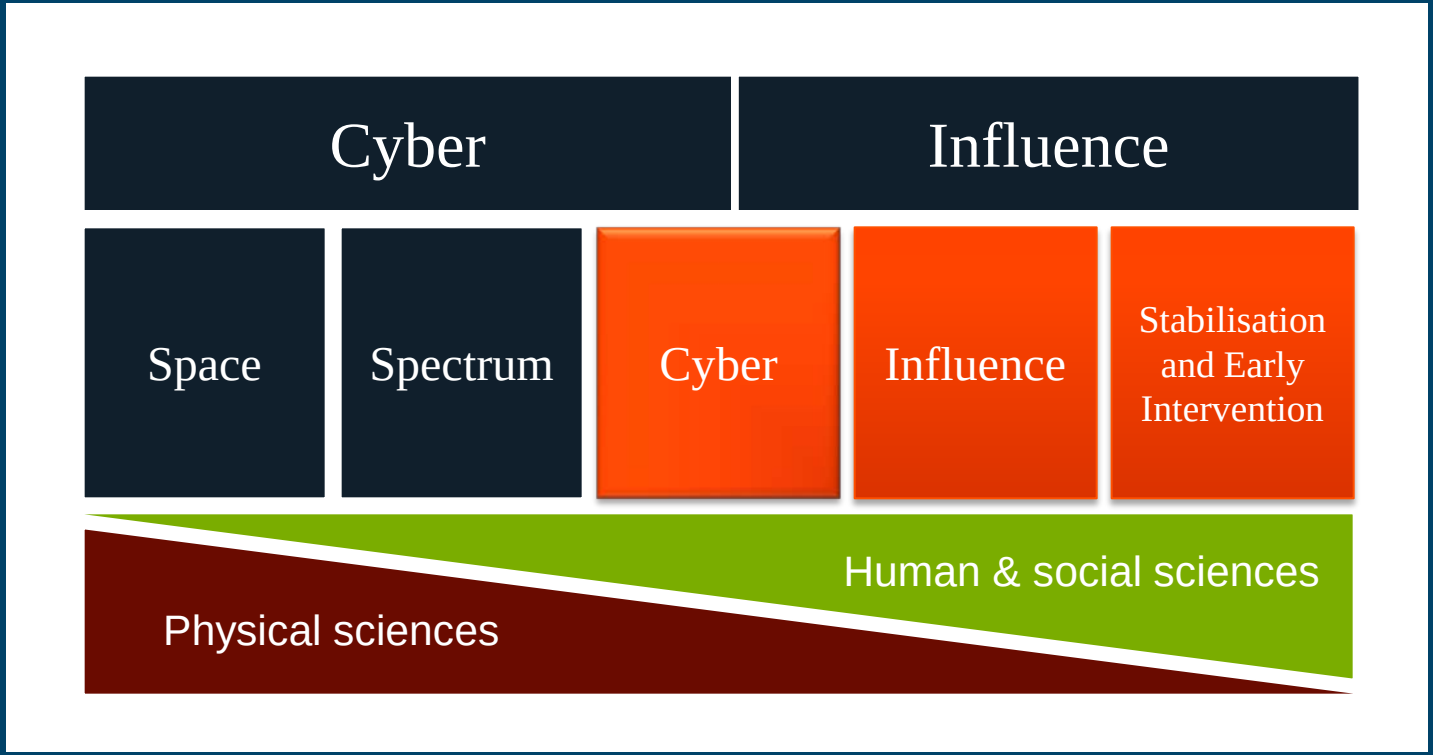
# Cyber and Influence portfolio

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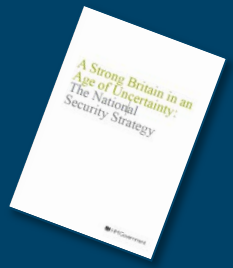
# Influence and Stabilisation

**National Security Strategy: Shaping a Stable World**
- Reduce risks to UK by applying instruments of power and influence to shape the environment
- Address trends that contribute to instability, and tackle potential risks at source.




**SDSR: Exert influence, exploit opportunity and manage risk**
- Power projection as defence contribution to UK Influence
- Provide security for Stabilisation


**FCOC: The Centrality of Influence**
- Influence public perceptions through battle of the narratives
- Wield influence across multiple media at higher tempo

**Building Stability Overseas Strategy**
- Early warning, crisis prevention and response
- Investing in upstream Prevention / UK Influence
- Cross-Government approach to Stabilisation Response Teams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# Influence – Possible Themes

**"Fighting battles is not about territory, it is about people, attitudes and perceptions. The battleground is there".**

**Gen. Sir Mike Jackson**

- Influence Tools and Techniques
- Cultural resonance and messaging
- Training, simulation and immersive environments for Influence
- Measuring the effects of Influence Activity
- Trust, authority and power online
- Personality and behaviours online / offline
- Cultural drivers of online behaviour and content consumption
- Traits of good (online) influencers
- Recruitment, training and selection
- Narrative development for Influence Ops
- PsyOps – Now and in 2020
- Tools and Metrics for Influence planning across Government
- Target Audience Analysis and profiling (online and offline)
- Social media monitoring, analysis and visualisation

# Stabilisation and Early Intervention – Possible Themes

**“Confidence in the future comes when people see that their needs & expectations are being met on the ground”.**
**[Building Stability Overseas Strategy, 2011]**

- Tools to support Stabilisation practitioners
- Training of non-specialists / accelerated learning
- Using Influence insights to enhance delivery of Stabilisation effect
- Cross-Government and international working / information sharing
- International Stabilisation Response Teams
- Indicators and Warnings to inform early intervention in developing crises
- Mobile apps to support Stabilisation
- SME reachback for deployed Stabilisation teams
- Networking, accreditation and information sharing at different classification levels
- Stabilisation ‘strategic narratives’
- Early interventions and soft power shaping through Influence and Outreach
- Measuring effect in Stabilisation and Early Intervention operations

# Desired expertise

- Human and Social Influence
  - Psychology, sociology, anthropology, social sciences
- ‘Cyber Influence’
  - Cross-disciplinary thinkers from the information / computer /human / natural sciences
  - Cyber-ologists
- Stabilisation / Early Intervention
  - Charities, NGOs, Think Tanks, Aid Agencies, Research Councils …
- Atypical Defence suppliers from
  - Cyber / ICT
  - Social media analysts
  - Information sciences
  - Human, social and behavioural sciences
  - Law, religion and ethics
  - Economists
  - PR, Comms and Marketing
  - Systems engineers
  - Polymaths and cross-disciplinary thinkers

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# What makes a good proposal?

- Must clearly and explicitly explain the proposed approach and potential benefits
  - What might your approach yield and how far will you get within the current project?
  - Why is this approach superior to others and how will you realise the potential benefits of your method?

- The ‘Wow!’ factor: looking at traditional problems in a new light
  - Fusing different disciplinary perspectives to tackle novel problems
  - Adapting / re-applying analogous approaches and ideas from other areas



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# Programme Outcomes / Benefits

- Enhanced UK ability to Influence effectively in the real world and online, using diverse levers of power, at a tempo which allows us to dominate the strategic narrative and information space.

- Reduced future cost and frequency of UKAF deployments on the ground, through earlier and more decisive ‘soft power’ interventions using multiple levers of influence.

- Improved UKAF capability to stabilise post-conflict situations by working across Government and in concert with allies and civilian partners.

# PREPARE –Proposed Land Training Research Requirements & Objectives FY13/14

Andy Kieselack

Land & Jt Logs Domain Dstl PO

PL3 – Future Programmes & Enablers

# PREPARE 1: Train for more tasks to operate in future environments

## Capability Gaps

- When moving from MST to contingency not clear how broader role of Reserves and will be trained
- Changes to training  when move to contingency insufficiently forward looking A2020, FCOC
- Lack of scientific evidence of skill fade to underpin policy and provision of re-familiarisation /currency  training

## Exploitation

- inform the development of training policy (e.g. relative priority of different training tasks)
- Inform Army 2020 training, and Land refresher training for retaining skills
- Inform the development of the supporting training capabilities  (incl non-live trng delivery eg. CATT, FCAST)

## Challenge

- Determine how All Arms and Reserves to train for broader range  of capabilities (eg. Cyber, Influence, CIED) cost effectively and with limited resources as move from.  Also determine how competence of trained tasks is retained in the absence/reduction of live training


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# PREPARE 1- Research Objectives

| | |
|---|---|
| Trg_1 | Understand Future Operational Environment and Army Structures. |
| Trg_3 | Identify potential training gaps/issues for Reservists and TAs |
| Trg_4 | Impact of Skill Fade and how to retain competence |
| Trg_5 | Determine the benefits of Land Logs CT |
| Trg_10 | Capture All Arms training required to deliver a broader range of tasks to eg. CIED, Cyber , Influence |
| Trg_12 | Improved Training for Mortar Operators |


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# PREPARE 2: Deliver Effective Training Systems & Enablers

## Capability Gaps

- Current training systems unable to support future training requirements
- Use of novel tools/COTS to delivery training material not fully exploited
- Training representations developed to support UOR ISTAR capabilities will not adequately support contingency/Army 2020 training.

## Exploitation

- inform training policy and requirements for future (eg. team, collective and joint) training systems incl. CATT, CAST
- Inform Scrutiny DP for procurement of training capability

## Challenge

- Determine cost effective changes required to adapt current training systems and develop/evaluate their underlying architectures to satisfy future training needs
- To provide support to business case development and subsequent assessment through the use of valid measures of training and cost effectiveness

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# PREPARE 2 - Research Objectives

| | |
|---|---|
| Trg_2 | Develop/exploit training techniques & tools for characterising and assessing the effectiveness of training options. |
| Trg_7 | Develop Land training system capability roadmap for future epochs to align with wider Defence capability |
| Trg_8 | Improve representation of ISTAR feeds to align with future training needs |
| Trg_9 | Determine the feasibility of novel technologies and enablers to support Land training |
| Trg_11 | Identify the issues associated with providing coherent visual feeds in Land training environments |

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# PREPARE 3: Exploitation of Novel Training Approaches

**Capability Gaps**

- The benefit of differing approaches/styles to teaching/training is not fully utilised and so not fully exploited

**Exploitation**

- Expand the use of novel learning techniques ( eg. collaborative learning) across Defence training community
- Inform Army policy on instructor training (incl Reservists)

**Challenge/Objective**

- Improve trainers awareness of novel teaching and learning styles to ensure that training staff have the skills and confidence to best utilise novel training media and techniques.

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# PREPARE 3 - Research Objectives

Trg_6 Determine how JSP822 process can better take account of the differing training/educating approaches, and educating skills when undertaking media options analysis

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# Key POCs

Andy Kieselack

Programme Leader  3 - Future Prog & Enablers

Tel: 01959 897169

atkieselack@dstl.gov.uk

Audrey Caldeira-Hankey

Capability Advisor  - Cbt Readiness &Trg (Land)

Tel: 0239253 2934

afchankey1@dstl.gov.uk

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CENTRE

# Human Capabilities for Counter Terrorism

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# Overview

- People are critical for achieving our desired effects in Defence. The CSA has a specific critical outcome for **“a particular focus on human and sociological aspects of capability”**
- This is never more critical than for than for Counter Terrorism.
- CTSTC runs a cross-cutting Human Capabilities programme ‘to increasing the effectiveness and well-being of people in UK CT.

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# Counter Terrorism Science & Technology Centre

- **Established in 2006 as the MoD's centre of S&T for CT**
- **Based in Porton Down as part of the Dstl Programme Office**
- **Approximate Defence Research Funding 12/13 £54m**
- **3 programme areas, each with a Programme Lead and Capability Leaders – including HF**

- **Explosive Ordinance Disposal**
  - Detection, identification, disposal
- **Counter IED**
  - Attack the system, defeat the device, prepare the force
- **Support to Tactical Operations**
  - Surveillance, C4I, offensive systems, mobility, soldier systems, power

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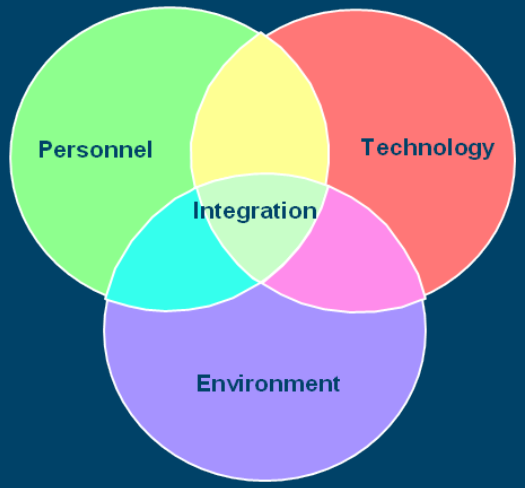
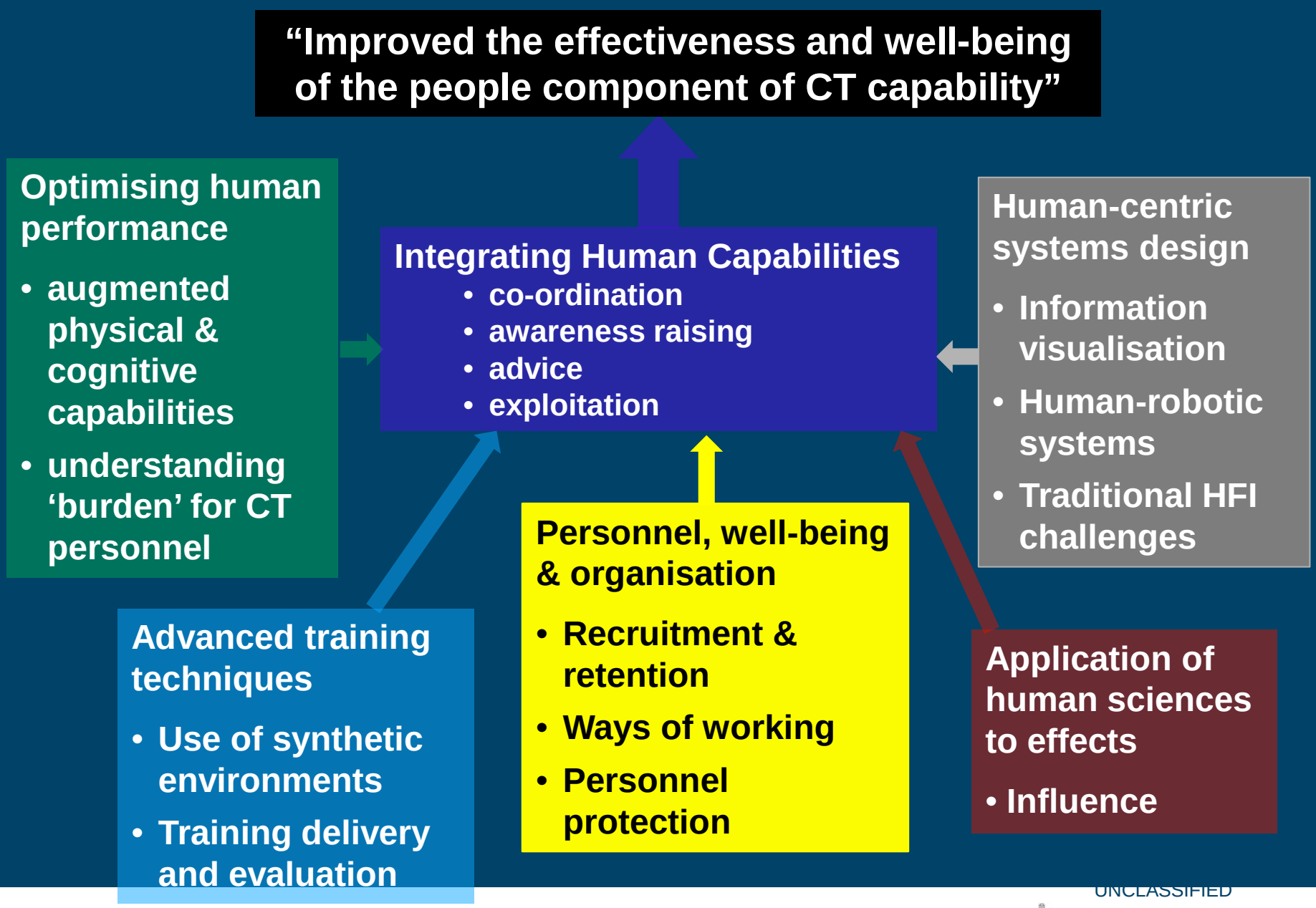
# HC for CT themes




- Broad, cross-cutting programme with elements in all three application areas
  - Optimising human performance
  - Advanced training techniques
  - Human-centric systems design
  - Personnel, well-being, organisational issues
  - Application of HS to CT operations
  - Integrating Human Capabilities


"Improved the effectiveness and well-being of the people component of CT capability"
Optimising human performance
• augmented physical & cognitive capabilities
• understanding 'burden' for CT personnel
Integrating Human Capabilities
• co-ordination
• awareness raising
• advice
• exploitation
Human-centric systems design
• Information visualisation
• Human-robotic systems
• Traditional HFI challenges
Advanced training techniques
• Use of synthetic environments
• Training delivery and evaluation
Personnel, well-being & organisation
• Recruitment & retention
• Ways of working
• Personnel protection
Application of human sciences to effects
• Influence

# Example of current CTSTC DHC STC project - 1

**Augmenting Intrinsic Cognitive & Physical Capabilities**

- A horizon scanning review to understand emerging ‘human augmentation’ techniques that could given personnel an extra performance boost .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# Example of current CTSTC DHC STC project - 2

**An Eye Movement Training Regime**

- Specialist Search & All Arms IED threat detection
- Differences in search technique between personnel with and without theatre experience.
- Creation of training method to modify novice search behaviour.
- Route & building search.

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# CT specific HC research

- Need to exploit general human factors/sciences research and also innovate around specific requirements
- Specialist users work in high risk operations, often in hostile environments
- Sensitive nature of work
- Rapid pace of requirement in line with ever changing threat
- Programmes tend to have a shorter time horizon – exploitability of outputs is essential

➢ Human Capabilities for CT is now an explicit programme in the CTSTC

# Programme delivery approach

- Delivered via the Dstl Human System Group
- Dstl – 40%; Industry/academia – 60%
- CT tends to be Government lead but this programme seeks to develop ‘Dstl-external supplier’ teams to get benefits from all worlds
- Currently using the DHC STC TIN 3 tasks to access the supply chain
- CDE and FATS routes may also be used
- Need a collaborative approach to develop a strong technical capability for on-going HC for CT research

# Contact


## Capability Leader

## 01980 617080

## ctcenquiries@dstl.gov.uk


CENTRE

# Human Systems Group


John Robertson
Group Leader

jmrobertson@dstl.gov.uk
030 67700 2959

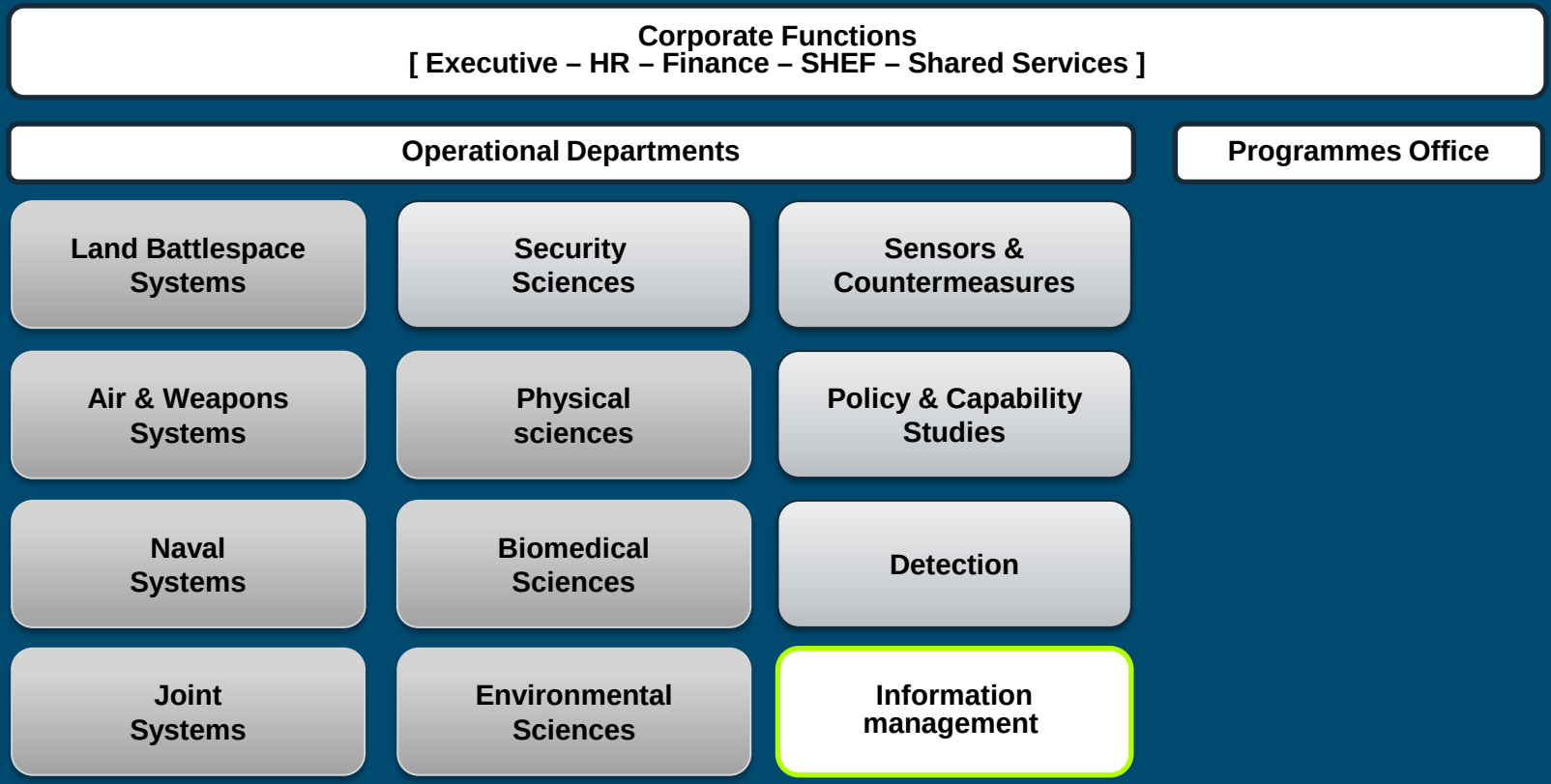
Sarah Bowditch
Group Principal

scbowditch@dstl.gov.uk
01980 658216

# Overview

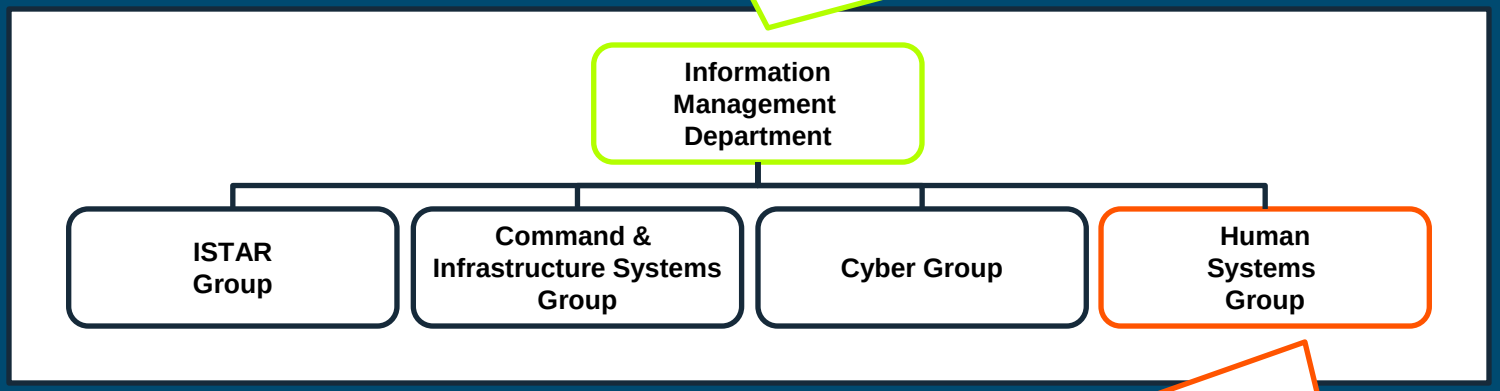
- Human Systems Group introduction
- Capability focus
- Environmental chamber
- DHCSTC requirements
- Technical Highlights

# Defence Science & Technology Laboratory



# Human Systems Group

IMD's purpose is to "maximise the impact of information and human systems on UK Defence and Security". This underpins Dstl's purpose "to maximise the impact of S&T on UK Defence and Security.

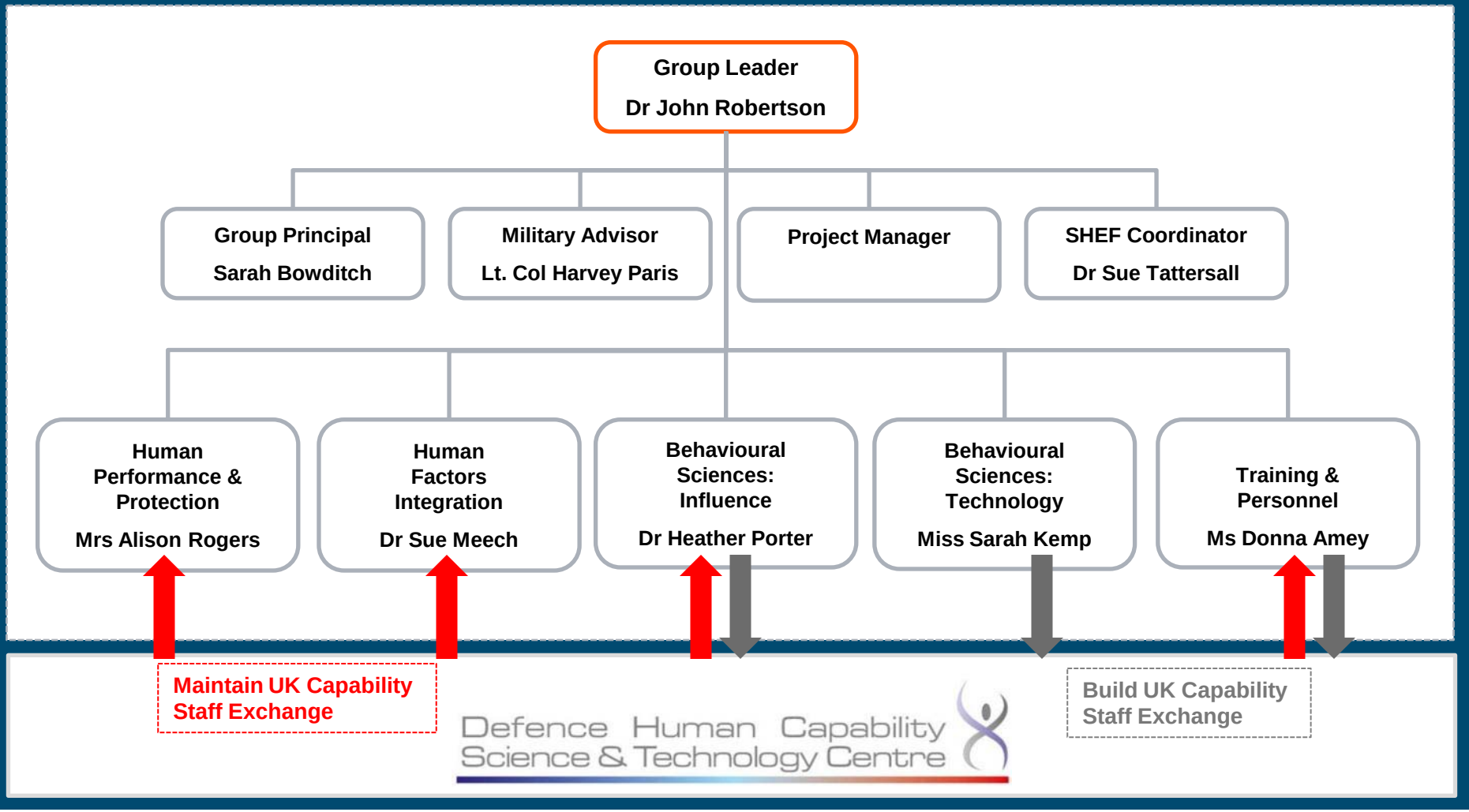



The Human Systems Group provides expert human science advice to maximise the performance of whole systems in support of UK Military, Intelligence Services and Counter Terrorism operations.

# HSG Capability

- Human Factors Integration
  - -Capability Advice through Consultancy
  - -Requirements Capture & Formulation
  - -Technical Oversight & Partnering
  - -Acceptance into Service
- Human Performance and Protection:
  - -Soldier Performance and Optimisation
- Behavioural Sciences (Influence)
  - -Human Behaviour & Social Network Analysis
  - -Military and Cyber Influence
- Behavioural Sciences (Technology)
  - -Exploitation of Science & Technology to identify Human Behaviour
  - -Situational Awareness & Decision Making
- Training and Personnel:
  - -Cross Domain Training, Training Analysis & Optimisation
  - -Recruitment, Retention, Motivation
  - -Health and Well Being

# Capability through partnership



# Human Factors Integration Team

- Capability focussed team delivering expert advice across MoD
- ToR are User/Systems Requirements formulation, Technical Oversight of Industry and Acceptance into service
- Small core team of scientists with additional agile/flexible workforce delivering surge capability (Herrick focussed)
- Current agile/flexible workforce achieved through Contracted Temporary Workers (CTW)
- Industry staff embedded within Dstl HFI Team helping to deliver Land and SF programmes
- Expect shift in Dstl capability and Industry support towards Air Worthiness and Certification

- DHCSTC needs to
  - be able to indentify subject experts that can respond to tasking with minimal notice. (The Dstl HFI team typically receive 2-6 weeks notice for support per task)
  - be able to undertake and deliver short (typically 2-4 weeks) support tasks that support priority programmes, UOR's or operations.
  - be able to manage, staff and deliver a complex and dynamic portfolio
  - be able to act impartially on behalf of Dstl and government

# Human Performance and Protection

- Team skills & capability:
  - Expert Physiologists & Dietician
  - Sports and Exercise Physiology including Biomechanics
  - Thermal, Respiratory and Visual Physiology
  - Sleep (electrophysiology) and Shift Work
  - Nutrition and Hydration
  - Team supports Dstl Clinical Trials
  - Team supports Dstl SAC
  - Team support Ethical protocols

- DHCSTC needs to
  - be able to support physiology based assessment of human and integrated systems performance
  - be able to second/embed physiology experts within Dstl to deliver dismounted soldier performance projects
  - be able to deploy embeds to operational theatres (e.g. SCIAD compound Lashkar Gar)
  - be able to provide impartial and robust scientific advice than can be used to form /update policy

# Climatic Chamber

- Climatic chamber(-5 to +55C) can be used to:
  - Recreate ambient temperatures UK Armed Forces are presently experiencing in-theatre and which may be encountered in future military operations
  - Test equipment, clothing, behavioural strategies to mitigate the strain attributed to climatic stress and to research novel ideas with which to protect operational personnel
  - Available for use to support DHCSTC and government funded programmes (inc. IRC)

# HFI & HPP Support to Operations

- The HFI and HPP Teams work with front line commands and users to undertake acceptance into service assessments of new equipment
- Assessments are performed through live field trials with military personnel.
- Dstl staff routinely deploy to operational bases to undertake acceptance into service assessments
- To grow and develop Dstl's future Capability Advisors and Technical Partners, technical staff need to be exposed to the wider MoD programme

- DHCSTC needs to
  - build and maintain an enduring working relationship with front line commands and Army TPO and TDU's
  - be able to plan, carry out and assess human trials with appropriate Ethical Protocols and Clearances
  - be able to manage, staff and deliver field trials that will involve deployment to operational military bases (including overseas)
  - be able to accommodate short secondments of Dstl scientists into Industry and/or Academia to build future Capability Advisors

# Behavioural Sciences Teams

- The Dstl Behavioural Sciences Teams undertake research and development that directly supports the UK's Military, Intelligence and Security Organisations
- The teams are seeking to exploit the latest academic thinking around:
  - Group Social Theory
  - Cyber -Social Behaviour
  - Social Network Analysis
  - Human Target Vulnerability Analysis
  - Individual/Group Identity Theory
  - Measures of Effect for Cyber Influence Operations
  - Information Operations
  - Measures of Effect for Information Operations

- DHCSTC needs to
  - indentify Industry and/or Academic capability that can inform/progress the behavioural sciences associated with Cyber and Influence operations
  - be able to undertake fundamental scientific research in behavioural sciences
  - indentify appropriate capability that can be seconded into Dstl (supporting Military and OGD's) to 'Operationalise' the latest academic thinking

# Training & Personnel Team

- The Dstl Training and Personnel Team is a new/small capability that centres on the Psychological aspects of Training and Personnel
- The Personnel capability is currently informing Defence Reform, Future Force Structure, NEM etc
- The Training capability is centred on the SDSR target of dramatically increasing synthetic training
- The psychological impact of reduced live user training, expected force readiness and optimum live/synthetic mix is being addressed
- The team undertake proof of principle synthetic studies for Military, Intelligence and Security organisations

- DHCSTC needs to
  - be able to undertake Task Analysis
  - be able to undertake Training Needs Analysis
  - indentify Industry and/or Academic capability that exploit, develop and deliver enhanced training
  - indentify subject experts that can help develop and deliver specialised user training

# Air Domain

*'…flies and doesn't intentionally explode…..'*

# Introduction

Aim: to provide an overview of Human Capability research within the Air Domain research Programme.

- Overview of Air Domain Programme
  - Sub-strategies
  - Context
  - Key Programme Elements

- Aircrew Systems Research Overview

# Air Domain Sub-Strategies

- Analysis & support to decision making

Maximising current generation air capability

Enabling future air capability

- Air Survivability

- Key Technologies for Future Combat Air Systems

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# Maximising current generation air capability

- Context
  - Post SDSR, MOD planning assumes that the capability provided by the current fleet of air platforms and systems will form the core of UK Defence Capability for the next 15-20 years.
  - UK MOD needs to maintain a flexible and adaptable capability to meet rapid and unpredictable nature of future conflicts.
- Approach
  - R&D is required to maintain and increase the cost effectiveness of current generation capability.
  - Programme addresses personnel, equipment & processes.
  - Provides advice and technologies that enable proactive management of capability through life.
  - Prioritised and coherent portfolio of projects that provide pan-Air Domain and pan-DLOD enabling research

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# Key programme Elements

- Personnel – improved preparation, protection and support of people.

  - Aircrew Training; *Provides MOD with requirements for more affordable and effective collective synthetic training - outputs are providing critical input into DOTC(A) procurement including acquisition strategy, Initial Gate and management through life.*

  - Aircrew Systems; *Delivers essential research on aircrew personal protection and equipment related issues.*

  - Airborne Visual Capability TDP; *Will demonstrate an aircrew Helmet Mounted Display (HMD) technology that has potential to meet a key DNAE need*

  - HAVM TDP; *Will reduce RW WLC due to reduced scheduled and unscheduled maintenance and improve availability supported by flight evidence; MoD has research underway to address CoVAWR legislation*

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# Aircrew Systems Research (ASR) Overview

Dstl POC: Dr Chris Goff, AWSD

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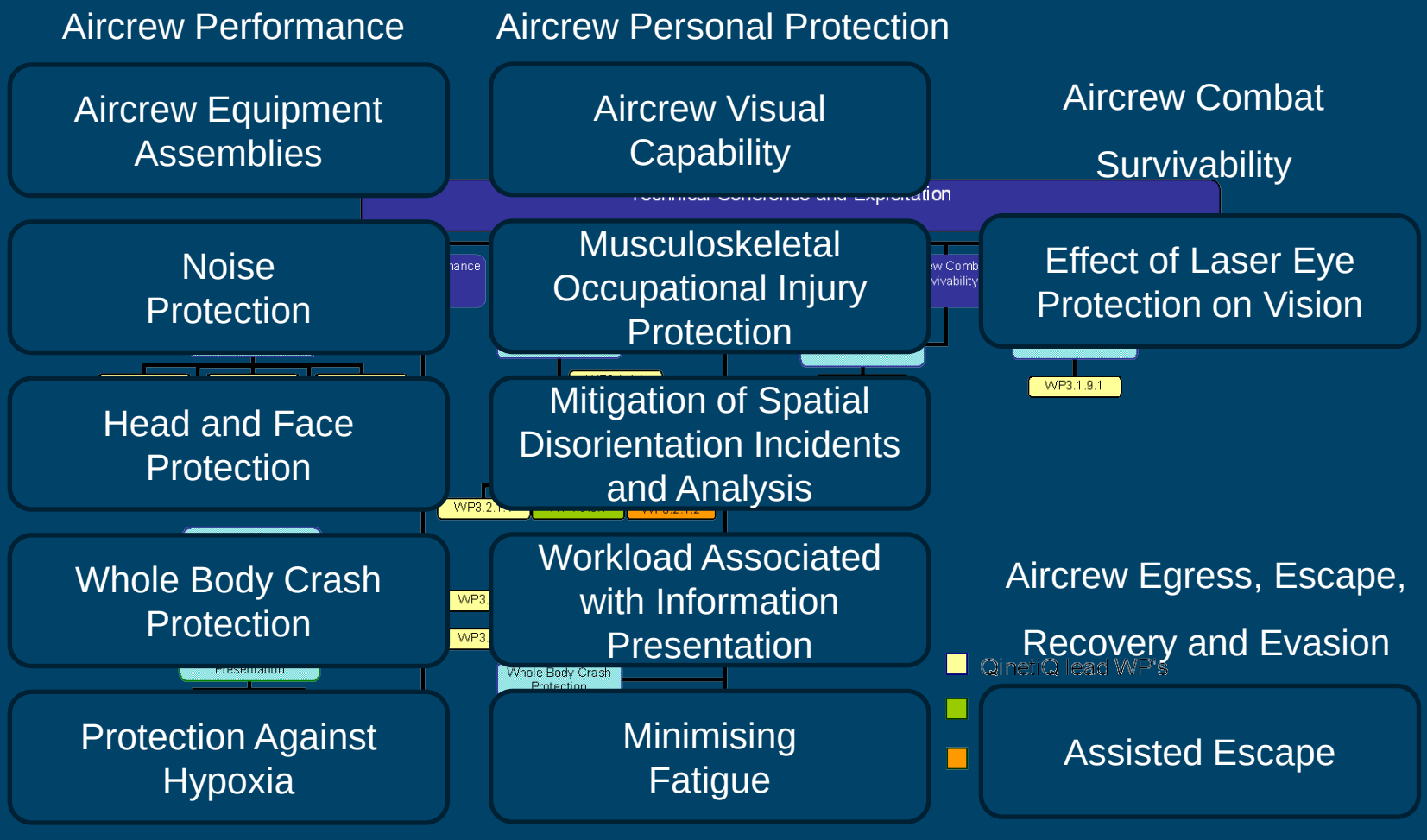
# The ASR Programme Overview



# The Aircrew Systems Customer Base

- ASR is a diverse programme and routinely engages across the entire Unified Customer
  - From requirements to procurement
- The ASR programme has technical representation at:
  - AE&S PT Working group
  - Night Vision Goggles (NVG), Musculoskeletal Injury (MSI) and Fatigue & Spatial Disorientation (SD) Steering groups
  - Review of DefStan for helmet impact protection (Military Aircrew Helmet Impact Standard (MAHIS))

# Recent Work

Fatigue

Spatial Disorientation

Hearing Protection

Night Vision

Head Protection

# Spatial Disorientation

## Issue

- Minimise flight safety incidents relating from SD

**Research Programme Action**

- SD aircrew survey undertaken periodically and review of flight safety reports
- Trends in factors associated with SD identified

**Outcome**

- Human Factors Training Course improved
  - Information booklets produced by programme incorporated
- Aeromedical training improvements (RAF CAM)
  - Simulator training improved to include real scenarios recommended by programme

# Night Vision

## Issue

- Better Night Vision desired to meet wider operating envelope
- Current equipment not always optimised

## Research Programme Action

- Thorough analysis of all training, procedures and use of Night Vision Devices (NVDs) for aircrew and maintainers
- Assessment of optimum use of current equipment

## Expected Outcomes

- Provide support to Air Cap Strategy (2012)
- Improvements to training and information for maintainers and aircrew
- Improvements to allocation of assets to the front line to suit operational needs maximising capability at no additional cost

# Future

- The programme will run some competed elements – see Contracts Bulletin
  - Visual capability
  - Importance of noise sources
- Current programme completes 2014

# Summary: Air Approach To Human Capability

- Limited HC specific research programmes
  - Aircrew Training
  - UAS Pipeline Training and Other DLODs Thrust
- Majority of projects have strong HC representation integral to Systems Engineering approach
  - Future Integrated Vision Enablers Research (FIVER)
  - Autonomy and Mission Management
  - Air Survivability projects
- HC provided by Industry SME supported by Dstl