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Defence Reporter

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Sample citation

The components for a typical citation, as they appear in Defence Reporter, are illustrated below:

Collection system identifier
Title

R0001C6D0
Airframe Structural Integrity Research and Technology Strategy - Phase 2
Dstl Porton Down (GB) (2009)
Within this report, Phase 2 of the task raised by CASD-ASI to develop a Structural Integrity Research and Technology Strategy is described. Additionally, development of fatigue data management systems to support several in-service aircraft fleets and expansion of low-cost Operational Loads Measurement capability development tasks are detailed.

Publisher, year of publication
Abstract

Defence Science and Technology

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MINISTRY OF DEFENCE

Report Documentation Page

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a. REPORT	b. ABSTRACT	c. THIS PAGE			
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Defence Reports

This section provides details of scientific and technical reports added to the MOD's ATHENA Collection in the previous period.

How to request reports
Reports from MOD's ATHENA Collection can be requested from Knowledge and Information Services
Tel: 01980 613971
Email: DefenceReporter@dstl.gov.uk

Note: The report citations listed in this publication have been generated using an automated document scanning process. As a result, some references may contain formatting and/or punctuation irregularities.

R00026671
An Investigation into the Suitability of "Buckypaper" for CB Protective Clothing
Dstl Porton Down (GB) (2010)
This report is the deliverable for the Capability Development project entitled "Investigation into the use of Double Walled Carbon Nanotube (DWCNT) mats for CB protection". The material, a 2D multi-wall carbon nanotube network called "Buckypaper" was purchased from FutureCarbon in Germany. The level of protection afforded by this material was determined against a liquid challenge.

R000259AA
Cermet Materials for Armour Applications
Dstl Porton Down (GB) (2011)
An overview is given of cermet or ceramic-metal materials; specifically the different types that exist, and their suitability for use as an improved armour material is presented. A focus on functionally graded particulate reinforced cermets is provided, driven by open literature sources citing the improved ballistic performance achieved by such materials. Should these materials offer improved ballistic performance, their application should be widely considered as they have the potential to be applied as a 'surface treatment' to metallic structures, improving ballistic performance without incurring significant mass penalties.

R00026601
Emergence in Complex Simulations: An initial examination
Dstl Portsdown West (GB) (2011)
This report outlines an initial examination of the literature, focussed on the issue of emergence occurring within complex military simulations. It is anticipated that the research will lead to the development of an automated solution, which will capture and interpret the phenomena for the analyst, allowing focus to be given to those important factors that drive the simulation. No quick win scenarios were discovered during this initial research, however areas of focus have been identified and a comprehensive plan of study has been developed.

R000261FE
Force Multipliers in Counterinsurgency: A qualitative historical analysis
Dstl Portsdown West (GB) (2011)
This study has used historical case study analysis to determine some of the principal, specifically military factors that have had an effect upon the likelihood of success in counterinsurgency in practice. This study was not intended to be a rigorous quantitative analysis of COIN. It has identified six factors that have had an overall positive effect upon the likelihood of success, two that had an overall negative effect and three that had no identifiable overall effect but which provide interesting broader insights. A potential exploitation route for this study is by using MARVEL (Method for Analysing Relations between Variables using Enriched Loops) to represent the internal construction of a COIN force and certain important contextual influences.

R00025CD0
GAMOV De-risking iteration 3
Dstl Portsdown West (GB) (2011)
This report outlines the 3rd development iteration for the Generic Aggregation Model Valuator (GAMOV) meta-modelling toolset. The intention is that GAMOV will provide a generic high level statistically based modelling capability for rapid quantitative assessments across the full range of military tasks. This development iteration expands upon the conceptual framework of entities and mediators, developed under iteration 2, to provide logistical and air power support. Additionally, an input and configuration system has been developed, extending core parts of the Python programming language, to handle versioning. This work provides the basis to develop an initial operating capability of the GAMOV concept, which is intended for the 4th iteration.

R000268DE
Intra-Theatre Lift: C2 Methodology
Dstl Portsdown West (GB) (2011)
The Measure of Effectiveness Resource for Layered Information Networks (MERLIN) tool, and underlying methodology, has wider applicability than its original scope of employment. This paper highlights how the tool and methodology has been applied in order to develop a representation of Command and Control (C2) in the Intra-Theatre Lift (ITL) model. The paper covers the methodology as it was applied to the problem and assumptions and limitations within the representation.

R00025A17
Materiel Distribution LOADS Study
Dstl Portsdown West (GB) (2010)
The aspiration for the LOADS Database is to contain information on the dimensions, mass and type of materiel being transported from the UK out to different

theatre locations. This data can then be used to inform other studies as well as forming an input to the Object-orientated Supply Chain Analysis tool (OSCA), enabling an improved understanding of materiel movements within the Joint Supply Chain (JSC). This report documents what work has been carried out in FY 09/10 to upload the LOADS database in support of Expeditionary Logistic Support (ELS) Theatre Ground Sustainment (TGS) and Assistant Chief Defence Staff, Logistic Operations (ACDS (Log Ops)).

R00026886
Merlin Logbook
Dstl Portsdown West (GB) (2010)
The aim of this logbook is to outline and record the current validation status of MERLIN. The logbook provides: a summary of the model use and history; details of the data inputs and outputs; an outline of the verification and validation status, and an overall assessment of MERLIN and fitness for purpose.

R000259B4
Model Obsolescence Guidance
Dstl Portsdown West (GB) (2011)
This report provides the MoD modelling and customer communities with guidance on model obsolescence, identifying the key reasons for model obsolescence and the possible courses of action to take when models become obsolete or as models approach their 'end of life'.

R00025CC9
Models for Negotiation Analysis: A Short Investigation
Dstl Portsdown West (GB) (2011)
This report is a short investigation of Drama Theory and the Graph Model for Conflict Resolution. It provides a short briefing on the two techniques and recommends developing awareness of, but not investing in developing a capability in, the application of these techniques.

R000269B7
Monte Carlo Bayesian Data Fusion Source Term Estimation Sensor Likelihood Models Technical Design
Dstl Porton Down (GB) (2011)
The Monte Carlo Bayesian Data Fusion (MCBDF) software library fuses uncertain CBRN data to make inferences about a possible release of hazardous material into the atmosphere. This document details the calculations used to calculate the likelihoods of the data conditional upon a particular hypothesized release. The likelihood models described are for: concentration sensors, bar sensors, particle counters, mobile chemical detections, wind measurements, and observations.

R000262C4
Optimised Manning Strategy: Application to the Type 26 Frigate and Mine countermeasure, Hydrography & Patrol Capability (MHPC)
Dstl Portsdown West (GB) (2011)
Key aspects of optimised manning are discussed and a 'top down' functional approach to achieving this goal is described together with methodological limitations. An alternative approach based on 'bottom up' comparisons with existing platforms of similar capabilities is also described. In practice a hybrid method for complement design has been adopted by MoD Project Teams. Six options for optimising the personnel requirements associated with platform functions are outlined. An overview of work in other countries indicated that these options have been employed in varying degrees to support more effective use of manpower on new classes of platforms. For the UK Type 26 Frigate project, currently in the assessment phase, the six options provide a means of examining the proposed complement for potential further optimisation. The UK's MHP Capability is in the concept phase and a core complement is being developed using the functional approach as a baseline for future development. An exploration of possible further reductions in personnel requirements is proposed using the six options to structure the analysis.

R000264A0
The Survivability Case: A New Approach to Air Vehicle Combat Survivability
Dstl Portsdown West (GB) (2011)
This report describes the contents and structure for a proposed 'Survivability Case' and recommends who should be responsible for developing, maintaining and executing each aspect. A Survivability Case needs to make an argument for why the platform is As Survivable As Reasonably Practicable and support this argument with appropriate and convincing evidence. It should comprise a Platform Survivability Case that addresses the survivability risks and mitigation measures associated with the design, modification and configuration of the platform and an Operational Survivability Case that addresses the survivability risks and mitigation measures associated with operating the platform. This requirement for an Operational Survivability Case might be satisfied by certain existing processes for assessing operational risk. The Operational Survivability Case is necessarily underpinned by the Platform Survivability Case created by the Defence Equipment and Support (DE&S) project team. Once formally accepted by the Aircraft Operating Authority (before the system is exposed to hostile threats), the Platform Survivability Case should be known as the Military System Survivability Case (MSSuC). It is proposed that Goal Structuring Notation (already used for some safety cases) provides an appropriate tool for recording the argument and citing the relevant evidence for the Platform Survivability Case / MSSuC. A model

MSSuC Report is provided at Annex A to illustrate how this might be implemented. The DE&S Project Team, or whatever body might have an equivalent role, should be responsible for developing and maintaining the Platform Survivability Case (later the MSSuC). The Aircraft Operating Authority should be responsible for developing and maintaining the Operational Survivability Case. Ultimately, responsibility rests at the highest level in MOD. Therefore, the MOD Second Permanent Under-Secretary should be provided with assurance (or 'ensurance") that a robust system for managing survivability risks exists and is being implemented effectively.

R00026680

An Assessment of Average Daily Work Demands Aboard Two Classes of RFA Vessels

Institute of Naval Medicine (GB) (2011)

Daily work demands of personnel aboard two classes of Royal Fleet Auxiliary (RFA) vessel were assessed, using heart rate (HR) as a measure of cardiovascular strain over an average working day. This is part of ongoing ergonomic investigation of work demands within the RFA. The aim was to assess the work demands, taking into account the ageing demographic of the workforce and a variety of lifestyle factors.
A combination of psychological and physiological measures was utilised on a sample of 77 male RFA personnel. In general, it was found that daily work did not present a high physiological demand as the work was predominately moderate and self-paced. Declining work ability was shown to be related to both increasing age and increasing adiposity as measured using waist circumference and body mass index. This indicates that management strategy should focus on weight management and lifestyle factors in order to slow this natural decline in subjective work ability. The lack of association between age and work demands is thought to be a consequence of the study design, being self paced work, and conclusions are limited to these types of task.

R00026662

Comparison of Different Filters for Improved Submarine Atmosphere Aerosol Sampling

Institute of Naval Medicine (GB) (2011)

An investigation of eight potential replacement submarine atmosphere aerosol sampling filters has been undertaken to identify a superior replacement to that currently used. Physical parameters investigated were particulate collection efficiency, pressure drop across the filter, and robustness of the filter. Two filters that at least matched, or bettered, the physical parameters possessed by the currently used filter, but additionally possessed lower published concentration levels of inherent trace metals were identified and investigated further. Finally, the collection efficiency, and material collected by these two filters was established, compared and contrasted.

R00025B18

Assessing the Heat Tolerance of Military Personnel

Institute of Naval Medicine (GB) (2011)

One of the major challenges for the exercising individual is temperature regulation, which is exacerbated when conducted in the heat. This can result in exertional heat illness, a condition that is not just prevalent among athletes but also the military population. Accordingly, JSP 539 requires all military personnel that have suffered a significant episode of exertional heat illness to be referred to the Institute of Naval Medicine's heat illness clinic in order to assess heat tolerance. This study was conducted using military volunteers (n=21) with no prior medical history of heat illness in order to provide normative data and a platform from which to validate the Institute's heat illness clinic. Subjects completed an assessment of maximal oxygen uptake and, following a rest period, undertook a one-hour heat tolerance assessment involving walking on a treadmill in combat clothing and carrying a 14 kg rucksack for the first 30 minutes. Mean and 95% confidence interval data were produced for key physiological variables: V02max; sweat rate; rate of rise of core temperature; heart rate and skin temperature.

R000267AD

Improvements to Submarine Atmosphere Aerosol Sampling: the Cartridge System

Institute of Naval Medicine (GB) (2011)

Aerosol sampling currently involves the onerous procedure of disassembling the front end of the aerosol sampling machine, carefully transferring by forceps a delicate sampling filter into position, followed by re assembly. This process must be repeated for each subsequent sample. Approximately 90% of sampled filters requiring laboratory analysis for specified hazardous analytes are returned damaged. This adversely affects the accuracy of the laboratory analyses and subsequent assessment of the health risks to the submariners. The cartridge system greatly improves operational efficiency by minimising the onerous manual handling element and improves the accuracy of health-based assessments by elimination of filter damage.

R000269F0

A survey of crew exposure to noise in a Warrior FV512 mechanised combat epair vehicle

Institute of Naval Medicine (GB) (2011)

Noise measurements were made in a Warrior FV512 Mechanised Combat Repair Vehicle. Time histories of sound pressure were acquired onto an Edirol audio recorder from four locations (commander, driver and rear crew seats) with the vehicle being driven over road, gravel track and cross country terrain. Measurements were made approximately 15 cm from the left ear of the crew; measurements were also made 'at the ear', underneath the Active Noise Reduction communication headset, of the driver. The data have been assessed and interpreted in accord with the Control of Noise at Work

Regulations 2005. Average noise levels ranged from 95 dB(A) during travel over gravel track to 110 dB(A) during travel over road, gravel track and cross-country terrain. Noise levels were generally higher at the driver's location compared with other crew seats. Exposure periods required to reach the 'upper exposure action value' of 85 dB(A) varied from about 1 minute to about 50 minutes. The noise exposure of all crew would be expected to exceed the upper exposure action value' specified in the CNAWR. Recommendations have been made including provision of information and training on the forms of action that personnel may take to reduce their exposure to noise, a rigorous programme of maintenance for all hearing protection devices used and appropriate health surveillance for noise- exposed personnel.

R00025CF2

A survey of crew exposure to noise measured in a Warrior FV510 personnel carrier

Institute of Naval Medicine (GB) (2011)

Noise measurements were made in a Warrior FV510 Personnel Carrier. Time histories of sound pressure were acquired onto an Edirol audio recorder from three locations (gunner, driver and rear crew seat) with the vehicle being driven over road, gravel track and cross-country terrain. Measurements were made approximately 15 cm from the left ear of the crew; measurements were also made 'at the ear', underneath the ANR communication headset, of the driver. The data have been assessed and interpreted in accord with The Control of Noise at Work Regulations 2005. Average noise levels ranged from 99 dB(A) during travel over cross-country terrain to 112 dB(A) during travel over road and gravel track. Noise levels were consistently higher at the driver's location compared with other crew seats. Exposure periods required to reach the 'upper exposure action value' of 85 dB(A) varied from less than 1 minute to about 20 minutes. The noise exposure of all crew would be expected to exceed the 'upper exposure action value' specified in the CNAWR. Recommendations have been made including provision of information and training on the forms of action that personnel may take to reduce their exposure to noise, a rigorous programme of maintenance for all hearing protection devices used and appropriate health surveillance for noise- exposed personnel.

R000264C3

Spatial Variability of Acoustic Signals Received in Shallow Oceans

Defence Science and Technology Organisation (AU) (2011)

The phenomenon of spatial variability in highly multi-path acoustic signal fields in shallow oceans is investigated in a general sense, for the purpose of identifying phenomena which are potentially exploitable for ADO applications for ASW (Anti-Submarine Warfare) and ASuW (Anti-Surface Warfare). It is shown that the statistics of spatial variability are determined by the angular distribution of the multi-path signal arrivals, and, for environments which may be approximated as isovelocity, these statistics may be related readily to parameters of the ocean environment that may be expected to be known or otherwise obtained. Expressions are given for the length scales which correspond with effective independence of received signal amplitude, for two different models of seafloor reflectivity for oceans of uniform depth. The implications of these findings are discussed.

R000264C4

The Establishment of High Resolution Melt Technique to Enable the Rapid Identification of Known and Novel Polymorphisms: A Cost Effective Alternative to Resequencing

Defence Science and Technology Organisation (AU) (2010)

High Resolution Melting (HRM) is a simple, PCR - based method for detecting DNA sequence variation by measuring the melting of a DNA duplex. This gene scanning technique can be used to detect variants without the need for prior knowledge of the identity or precise location of the variant. This report describes the development of a HRM technique to analyse the coding regions of the BCHE gene. In total 25 amplicons, which cover the 4 exons of the gene, were utilised. The sensitivity and specificity of the technique using gDNA isolated from both buccal and blood samples were compared. HRM was shown to be a simple and robust method for detecting DNA sequence variants, with a rapid turn-around time and minimal cost, reducing the need to generate sequence data.

Project ATHENA is a MOD-funded project run by Dstl to provide MOD with a central repository for storing scientific and technical (S&T) reports of current and past research programmes and projects. This repository is known as the ATHENA Collection and is made available to MOD and Industry through a variety of products and services.

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