Capita

The Journey to Data-Driven Training for Defence Operational Success

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Contents

1. Abstract

This paper discusses the significant role of data in enhancing training and simulation in Defence. It highlights the advancements in utilising various data streams generated during training activities and the potential opportunities that modern technologies offer.

The paper discusses the use of data analysis to improve training quality and efficiency. It highlights the strategic significance of data, its modern collection methods, and the maximisation of its utility. The paper highlights the benefits of task synchronisation and resource optimisation in multi-role, multi-site training. It emphasises the necessity of continuous improvement in data policies, standards, and architectures to enhance training and simulation. The paper also discusses the importance of linking training and operational data, managing persistent and human performance data, and exploiting physiological biometrics data.

Its conclusion suggests adopting common data standards, protocols, and architectures, and implementing clear policies and guidelines. While exploiting training and operational data can provide an operational advantage, it's crucial to protect the rights and interests of military forces and stakeholders. This includes data minimisation, encryption, authentication, auditing, backup, governance, and education, along with the ethical use of data management and analytics.

Keywords:

Training and Simulation, Master Data Management, APIs, Single Source Taxonomy, Data Analysis and Collection, Course Modernisation, Continual Improvement (CI) Mindset, Allied Interoperability, Allied Interchangeability.

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2. Introduction

Training and simulation are essential components of military readiness and operational effectiveness. They provide realistic and cost-effective ways to prepare military for various scenarios, enhance their skills and capabilities, and evaluate their performance and outcomes. However, to fully leverage the benefits of training and simulation, the Armed Forces face several challenges related to data management and analytics.

This paper reviews utilisation of various data streams in the context of training and simulation activities as well as the effectiveness of creating centralised data platform for training data management. The goal is to leverage multiple data streams to eliminate data siloes, improve successful training outcomes and training efficiency. A prototype capability is discussed which creates a centralised view of the training courses, instructors, training environments and trainees and optimises the effectiveness of training for the trainees, trainers, and management. This creates opportunity for course modernisation and continual improvement.

Future capability is discussed where several opportunities are identified and could be realised through technologies currently available. Modern data collection and exploitation can also act as integrator, improving interoperability and interchangeability for multi-domain Forces.

2.1 Problem Statement

The challenge to become data-driven organisation is often related to people and organisation rather than technology per se. Master data management strategies commonly follow a hybrid approach, where data governance and architecture is centralised, and business intelligence and data science is de-centralised (Gartner, 2023).

In the UK Defence sector, the prevalence of siloed data due to multiple factors such as legacy systems, incompatible platforms, diverse domains, varying cultures, conflicting interests, and limited resources is a significant issue. This situation hampers the ability to share and integrate training data among allies and partners, which is essential for achieving interoperability and interchangeability.

Furthermore, the lack of clearly defined the roles, responsibilities, and expectations of data providers and consumers limits data sharing. This limitation obstructs the ability to establish trust, acceptance, and adoption of data within the defence sector.

Additionally, the challenges associated with effective data collection, attributed to the absence of standardised techniques, tools, or methods that can extract relevant and reliable data from various sources, hinder the ability to diversify, enrich, and utilise data in the training context.

These problems collectively pose a significant obstacle to the effective use of data, thereby impacting the achievement of interoperability and interchangeability among allies and partners.

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3. Approach

Data is at the heart of Capita's training approach, with all the training and simulation products controlled by processes and work instructions that enable maximum recovery of data during and after use. A report by Paul O'Neil and Patrick Hinton (October 2023) for RUSI emphasises a must have requirement for Defence, is to constantly refresh its skills base by bringing in new talent and, increasingly, reskilling and repurposing its existing talent. The Haythornthwaite (2023) Review also aligns to this highlighting the importance of people in providing the 'adaptive edge'. Training modernisation starts with a human centric approach with data and technology acting as the enablers in the implementation.

Multiple engagements with the Armed Forces have given provided a deep understanding of the 'as-is' data state and have therefore enabled us to define a more detailed data approach to understanding and implementing training. The methodology used for assessing data projects follow a Government Digital Standard method which starts with a discovery phase. Discovery is the initial phase of a project where we define the problem that needs to be solved. During this phase, user research is conducted to understand who the likely users are, what they are trying to achieve, and the problems or frustrations they experience. We also determine the technical, process, and financial constraints that need to be addressed. The following section summarises discovery key findings from past and present projects in military training context with reference to potential data issues.

Siloed Data

Siloed data refers to the fragmentation, inconsistency, and inaccessibility of data across different platforms, systems, and domains within military organisations. Siloed data can be reduced or eliminated by adopting common data standards, protocols, and architectures that enable seamless data exchange and collaboration among different platforms, systems, and domains. This can improve the consistency, accuracy, completeness, timeliness, and security of data for training and simulation purposes.

Data Sharing

Data sharing refers to the ability to exchange and integrate data within the UK Armed Forces as well as among allies and partners for common purposes. Data sharing can be enhanced by establishing clear policies, guidelines, and agreements that define the roles, responsibilities, and expectations of data providers and consumers. This can improve the trust, acceptance, and adoption of data for training and simulation purposes.

Data Collection/Scraping

Data scraping refers to the ability to extract relevant data from various sources, such as websites, documents, images, and videos. Data scraping can be optimised by employing advanced techniques, this can improve the diversity, richness, and usefulness of data for training and simulation purposes.

Allied Interoperability & Interchangeability

Allied interoperability refers to the ability of military forces to act together coherently, effectively, and efficiently to achieve tactical, operational, and strategic objectives. Allied interchangeability refers to the ability of military forces to substitute for each other's capabilities or assets when needed. Interoperability and interchangeability are essential for achieving synergy, efficiency, and effectiveness among allied forces in joint operations or missions. By overcoming the challenges of siloed data, data sharing and data scraping, the potential for achieving the following benefits exists:

- Siloed data can be reduced or eliminated by enabling a common operational picture (COP) that provides a shared situational awareness (SA) among allied forces. This can improve the coordination, communication, and collaboration among allied forces in joint operations or missions.
- Data sharing can be enhanced by enabling a common information environment (CIE) that provides a shared knowledge base (KB) among allied forces. This can improve the learning, improvement, and innovation.
- Data scraping can be optimized by enabling a common intelligence picture (CIP) that provides a shared threat assessment (TA) among allied forces. This can improve the anticipation, prevention, and mitigation in joint operations or missions.

Training & Operational Data

Our engagement with previous projects has seen vast quantities of training and operational data being produced in training context, however the data is often not used effectively due to the complexity and volume of data. The technology available at the time could not support the comparison or harmonisation of the data and this could only be done by human interaction which is costly and time consuming. Now with the use of AI and the associated technologies, the analysis of vast quantities of data can provide the intelligence we can utilise in training development and delivery.

Training and operational data (new and legacy) can be classified into four categories. All four types can be exploited for operational advantage using various techniques, tools, and methods, such as AI, ML, big data analytics, cloud computing, edge computing, etc. These techniques, tools, and methods can help extract, process, analyse, and visualize training and operational data to provide useful information and knowledge for military purposes.

- **"Structured data"** is data that has a predefined format or schema, such as numerical values, text fields, dates, etc. Structured data can be exploited to perform statistical analysis, pattern recognition, anomaly detection, correlation analysis, prediction, optimization, etc. on training and operational data to reveal trends, insights, gaps, opportunities, and threats for military purposes.
- **"Unstructured data"** is data that does not have a predefined format or schema, such as images, videos, audio, documents, etc. Unstructured data can be exploited to perform natural language processing (NLP), computer vision, speech recognition, sentiment analysis, topic modelling, text summarization, etc. on training and operational data to understand the content, context, and meaning of text, images, videos, audio, documents, etc. for military purposes.
- **"Semi-structured data"** is data that has some elements of structure but also contain unstructured elements, such as emails, social media posts, web pages, etc. Semi-structured data can be exploited to perform web scraping, information extraction, information retrieval, information fusion, etc. on training and operational data to collect, integrate, and use relevant information from various sources, such as websites, documents, images, videos, etc. for military purposes.
- **"Geospatial data"** is data that has a geographic or spatial component, such as coordinates, maps, satellite imagery, etc. Geospatial data can be exploited to perform geospatial analysis, geospatial intelligence (GEOINT), geographic information systems (GIS), remote sensing, etc. on training and operational data (new and legacy) to understand the spatial relationships, patterns, and dynamics of physical features, events, activities, etc. for military purposes.

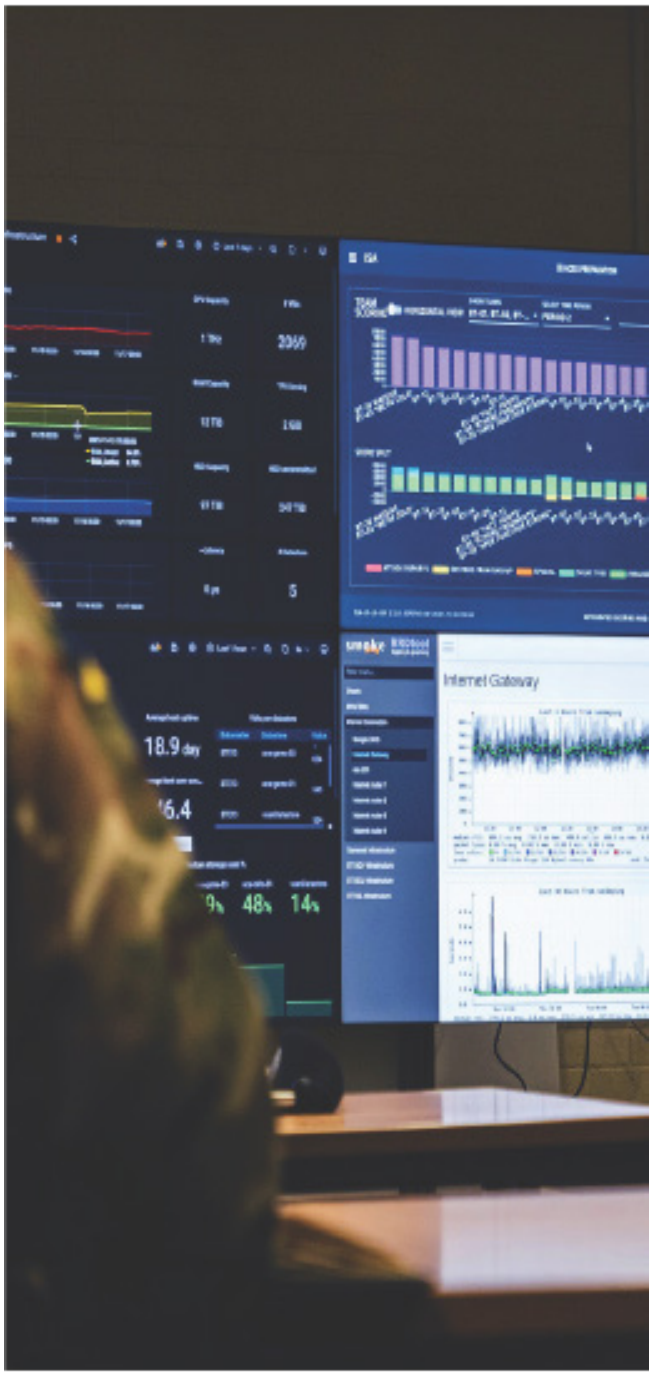
Persistent Data

To fully leverage the benefits of training and simulation, the military need to address the challenges and risks of persistent data in training technology. Persistent data refers to the data that survives after the process with which it was created has ended. In other words, persistent data is stored in non-volatile memory, such as disk or cloud, and can be accessed, analysed, and shared indefinitely. Training technology, such as virtual reality (VR), augmented reality (AR), mixed reality (MR), and biometric sensors, can generate large amounts of persistent data that can provide valuable insights into defence personnel' identities, locations, behaviours, preferences, health conditions, psychological states, and performance levels. However, persistent data can also pose significant risks for privacy, security, ethics, and legal compliance.

For instance, persistent data can reveal sensitive information about defence personnel that can be exploited by malicious actors for cyberattacks, espionage, sabotage, or propaganda. Moreover, persistent data can raise ethical and legal issues regarding consent, ownership, control, accountability, transparency, and fairness.

Persistent data in training technology can come from various sources and have different types. Some of the common sources and types of persistent data in training technology are:

- **VR/AR/MR devices:** These devices can create immersive and interactive environments that simulate real or fictional scenarios for training purposes. These devices can capture and store various types of persistent data, such as images, videos, audio, text, gestures, eye movements, etc., that reflect defence personnel' interactions with the virtual or augmented world.
- **Biometric sensors:** These sensors can measure and monitor defence personnel' physiological, cognitive, emotional, and behavioural data during training sessions or exercises. These sensors can collect and store various types of persistent data, such as heart rate, blood pressure, skin temperature, sweat response, brain activity, eye movement, voice patterns, facial expressions, mood, stress, anxiety, etc., that reflect defence personnel' physical and mental states and performance levels.
- **Wearable devices:** These devices can provide defence personnel' with real-time feedback, guidance, or interventions based on their individual needs, goals, and contexts during training sessions or exercises. These devices can collect and store various types of persistent data, such as location, movement, speed, acceleration, direction, orientation, etc., that reflect defence personnel' spatial and temporal dynamics.
- **Smartphones/tablets:** These devices can provide defence personnel' with access to information and services during training sessions or exercises. These devices can collect and store various types of persistent data, such as contacts, messages, emails, social media posts, web pages, documents, images, videos, audio, etc., that reflect defence personnel' communication and information activities.



Human Performance

Training and simulation are essential components of military readiness and operational effectiveness. They provide realistic and cost-effective ways to prepare defence personnel for various scenarios, enhance their skills and capabilities, and evaluate their performance and outcomes. However, to fully leverage the benefits of training and simulation, the military face several challenges related to data management and analytics. One of these challenges is how to collect, monitor, analyse, and use human performance data from defence personnel during training sessions or exercises. Human performance data refers to the physiological, cognitive, emotional, and behavioural data of defence personnel that can be collected, monitored, and analysed by biometric sensors or other devices. Human performance data management and analytics aim to enhance the health, wellness, resilience, and readiness of defence personnel by providing personalized feedback, guidance, and interventions based on their individual needs, goals, and contexts

Human performance data can be classified into four categories:

- Physiological data measure the physical characteristics or functions of the body, such as heart rate, blood pressure, skin temperature, sweat response, brain activity, eye movement, etc.
- Behavioural data measure the actions or outcomes of the individual, such as speech, movement, reaction time, accuracy, efficiency, etc.
- Emotional data measure the affective states or reactions of the individual, such as mood, stress, anxiety, fear, anger, happiness, etc
- Cognitive data measure the mental abilities or processes of the individual, such as attention, memory, reasoning, problem-solving, decision-making, etc.

All four types of human performance data can be collected, monitored, and analysed during training sessions or exercises using various biometric sensors or devices, such as electrocardiogram (ECG), electroencephalogram (EEG), electromyogram (EMG), galvanic skin response (GSR), eye tracker, voice analyser, motion capture, wearable device, smartphone, tablet, etc. These biometric sensors or devices can be integrated with training platforms or systems, such as virtual reality (VR), augmented reality (AR), mixed reality (MR), serious game, computer-based training (CBT), etc. to provide a comprehensive and holistic view of defence personnel' physical and mental states and performance levels during training sessions or exercises.

These potential data issues can lead to numerous consequences ranging from data privacy risks and data leaks to more serious and even fatal events. A significant example of siloed data comes from the case of Private Jethro Watson-Pickering, which exemplifies how data sharing can be life safety critical in our modern military world. Private Jethro Watson-Pickering died after the gun turret of the Scimitar he was driving struck him on the head after hitting a tree in October 2021. An investigation into his death during a training incident has found the crew lacked the proper qualifications to operate it. His competency had been granted through the training received on a Sultan Personnel carrier which had the same chassis and driving competency but without the inherent danger of a turret above the driver's position.

A service inquiry ordered by the Defence Safety Authority (DSO) concluded as part of the investigation into this tragic accident that the training record keeping was inaccurate leading to confusion about his, and other soldiers travelling on the vehicle, qualifications. Since the case, the DSO has recommended that only fully trained personnel are given a qualification in the future (Sivills-McCann, David, 24 November 2023).

Accurate and full records in data systems is paramount to ensure safe use of alternative equipment. This is a powerful example why data silos need to be eliminated and correct level of data sharing established between systems.

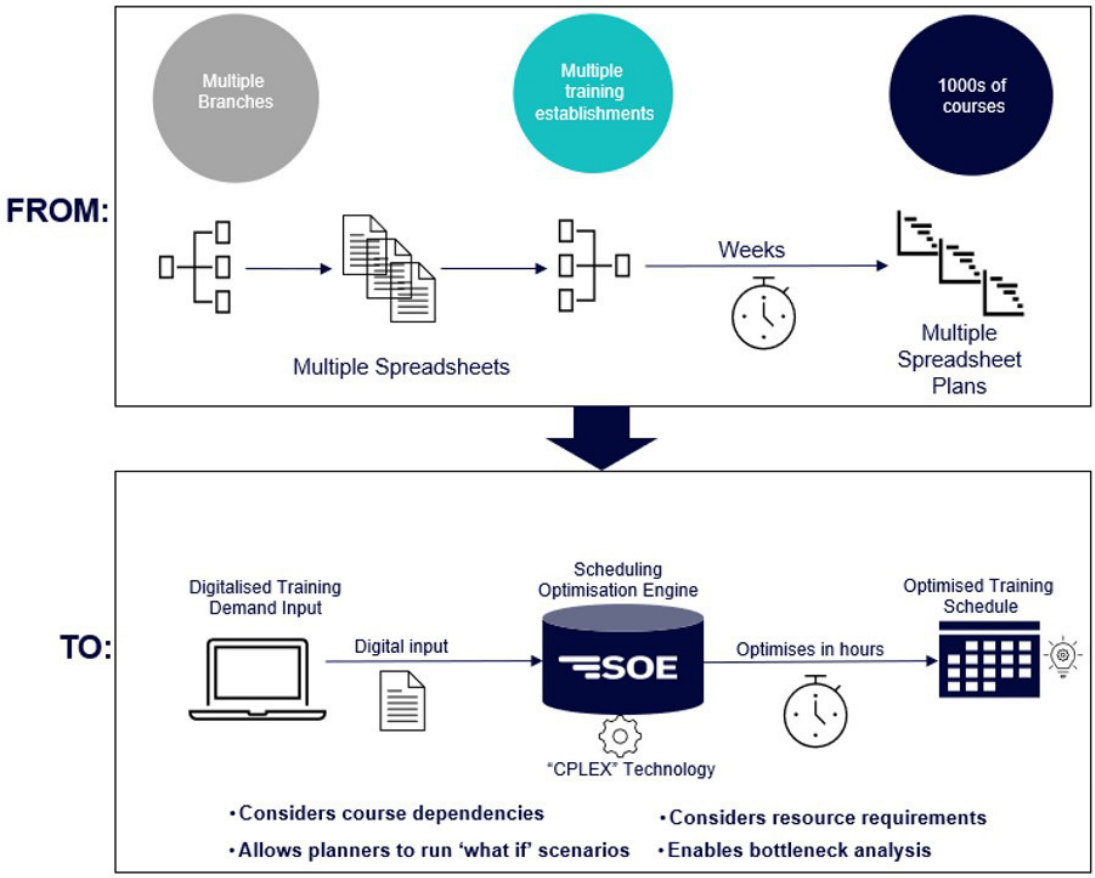
3.1 A prototype capability for optimising training delivery

Technology acts as an enabler for effective data-led strategy, according to Urban, Chen and Reuben (2024) study, many organisations still struggle to harness and translate new technologies into a competitive advantage. Their argue that several factors are significant predictors of success which include the choice of data platform, knowledge transformation, technical skills, and transformation alignment.

We are bringing benefits in tackling the complexity of synchronising tasks and optimising resource use generated by the complexity of multi-role, multi-site training delivery. The process for planning and scheduling complex training is detailed and time consuming due to over 1,000 course types and tens of thousands of course instances delivered across multiple training branches by 100's of training personnel. Multiple data sources needed to be validated and matched through a manual process with output being added to a bespoke centralised training administration system used in the Forces.

As part of a training modernisation programme, Capita is building a 'Scheduling Optimisation Engine' (SOE) solution which supports the Statement of Training Requirement (SOTR) to Statement of Training Tasks (SOTT) process. It is designed to digitally capture training demand, and automatically generate an optimised training schedule considering course dependencies and resource requirements, that predicts shortfalls, allows 'what if' scenarios to be run to plug gaps, and visualises an optimised training schedule that can be fed back into a centralised system.

The SOE applies the latest digital, data analytics and processing technologies, including IBM's prescriptive analytics solution 'ILOG CPLEX' Optimisation Studio technology, capable of finding an optimal solution rapidly from billions of permutations. The solution enables rapid development and deployment of decision optimization models using mathematical and constraint programming. By utilising API-first development, the system can update the centralised master data source in real-time, thus reducing data errors, siloed data and comply with data management policies as well as roles and responsibilities.



Prototype testing of the SOE commenced in April 2023 to automatically generate training schedules for Weapons Engineering courses. The solution is delivered using agile scrum methodology and the following iterations of the solution respond to user feedback and finetune the accuracy of the optimised results. The results from the prototype testing proved accuracy of the model against various KPIs and early results show significantly shorter overall planning lifecycle. The new engine can reduce the time taken by the schedulers from current timeline of months to only one or two days, enabling the release of resources for other duties resulting in a significant cost savings.

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4. Results & Discussions

In partnership with the client, the team developing the SOE solution is adopting a continuous improvement mindset as part of the delivery methodology as a fundamental principle. In essence, continuous improvement mindset is about fostering a culture of ongoing learning, experimentation, and adaptation to enhance performance and efficiency. Once further finetuned, Schedule Optimisation Engine (SOE) can optimise scheduling of training bringing together data from multiple sources with personnel and asset availability, course syllabi data, cost data to create an integrated schedule to maximise the resource efficiency and minimise training displacement for the trainees.

This is an example of where data management and especially data virtualisation enables the organisation to seamlessly access, integrate, analyse, and model data in real-time (Duggineni, 2022) as well as joining siloed data sources to improve operational efficiency. O'Neil, Paul. Hinton, Patrick (October 2023) RUSI report identified that "…the mechanical SOTR/SOTT process that connects recruitment and training remains challenging, although early results from Project Selborne's use of AI through its new schedule optimisation engine allow an immediate digital recasting of the SOTR/SOTT plans when the situation changes, or a new operational requirement is introduced." Furthermore, the accessed data can be used to identify where training or simulation products deliver the efficacy of training. In another defence training modernisation programme (The Defence Fire & Rescue Project which services over 60% of MOD fire stations), data is being used to help improve the design of future training and simulator products by understanding the objective responses recorded through the system. This enables more efficient delivery of delivery of virtual and augmented reality experiences.

Outputted data is stored in useable databases utilising an agreed taxonomy enabling multidomain understanding. Whilst not all data is common in terms of the training or use of simulator products, where there are commonalities, the data is shared across those product support teams to encourage multiple learning growth areas in parallel. This creates training courses which have a bespoke feel and all key performance indicators can also be centrally co-ordinated and collated.

The training and education with respect to the data collection and maintenance has been a major part of the journey. Creating the structure and business processes that support the standard creation and entering of data is the key enabler that has led to a master data system that can benefit customers to achieve a much higher success rate in their training delivery and route to competency.

Having used the latest tools, we have been able to gain a much better understanding of the quality of the training – whether the task trained for is able to be completed successfully or if further training is required. We have been using data analysis to improve the methods and media process for training design in the early analysis stage. This is now impacting course modernisation making the courses more compact with higher quality utilising high quality media, giving financial benefits to the organisation and better trained students that spend less time in training and between 20-30% more time on duty.

4.1 Discussion

As part of the journey to data driven training and maximising operational performance, there are several areas worth considering.

The journey is likely to be cyclical rather than linear where striving for continually improved data is a valued activity. New technologies will disrupt the status quo and a continuous improvement mindset is needed with effort on improving data policies, common data standards, architectures, data collection tools and analysis.

Master data management and data interpretability requires engagement with operational and organisational stakeholders first and foremost; technology is an enabler for the policy and process implementation, but the value creation is done through human centric approach.

Training cannot be improved fully without linking training and operation data together to exploit the operational feedback aspect. The operational data to be collected needs to cover all the four key areas – structured, unstructured, semi-structured and geospatial data – to enable validity of the feedback learnings.

Caution is advised with persistent and human performance data retention, for example human performance data may include personal details that are no longer needed, nor legal to be retained in training systems. Physiological biometrics data is currently under exploited in defence whilst in other areas such as sport it is used more prevalently. Individual performance could benefit from utilising biometric data to enhance and personalise training, however, it is highly regulated as there are significant ethical, legal, and social implications to collection, storage, and exploitation of this data.

Siloed data should have been reduced or eliminated by adopting common data standards, protocols, and architectures that enable seamless data exchange and collaboration among different platforms, systems, and domains. For example, by aligning to NATO's STANAGs (Standardisation Agreements) which cover various aspects of interoperability, such as communications, information systems, logistics, armaments, etc. the consistency, accuracy, completeness, timeliness, and security of data for training and simulation purposes can be enhanced. As with operational and training data, historically an efficient, cost-effective technology platform has not been available for this level of data exchange and collaboration.

Exploiting training and operational data (new and legacy) can offer several benefits for operational advantage that can enable military to achieve their strategic objectives in a competitive information and technological age. Some of these benefits can be applied especially to simulation training such as:

- exploiting previous operational data for situational awareness (SA) to monitor and understand the current state and dynamics of the battlespace across all domains (land, air, sea, space, cyber). This can help improve training design among military forces for joint operations or missions.
- providing decision support (DS) in simulation-based training that can help planners execute courses of action (COAs) that are optimal or feasible given the available resources or constraints in training context.
- providing performance assessment (PA) that can help trainers to evaluate and measure the outcomes and impacts of their actions or interventions.
- allowing evaluation of the training system itself to measure whether the right type of training event and/or activity has been delivered to achieve the desired outcomes as per the Statement of Training Requirements (SOTR)

4.1 Discussion continued

To overcome the challenges and risks of exploiting training and operational data for enhanced training purposes, best practices on data management are required to be in place:

- Review investment needed for upgrading systems or networks to support the data requirements and compatibility with existing or emerging platforms or systems.
- Review and develop rigorous data quality and data analytics standards and methods to ensure the accuracy, reliability, and validity of training data. Consideration should be given to clear and comprehensive data visualization and communication tools to help military personnel interpret and utilise the data.
- Enforce ethical, legal, and social policies and guidelines to protect the rights, interests, and values of military personnel or other stakeholders. Promote transparency and accountability and involve military personnel or other stakeholders in the design, development, testing, evaluation, and deployment of data driven training strategies.
- Monitor and evaluate the effects and impacts of utilising military personnel's physical or mental states or performance levels in training. Consideration needs to be given to provide appropriate support or interventions to prevent or mitigate any negative or harmful effects or impacts of collecting data on military personnel's health, wellness, resilience, and readiness.

4.1 Discussion continued

To mitigate the risks of persistent data in training technology, best practices should be present or implemented that protect the rights, interests, and values of defence personnel and other stakeholders. Some of these best practices and recommendations are:

- **Data minimization:** collect and store only the necessary and relevant data for training purposes and delete or anonymize the data when it is no longer needed or useful. This can reduce the amount and scope of persistent data in training technology and limit the exposure or leakage of sensitive information.
- **Data encryption:** encrypt persistent data in training technology using strong and secure algorithms and keys. This can prevent unauthorized access or modification of the data by malicious actors or third parties.
- **Data authentication:** authenticate the identity and authorization of the data providers and consumers using multi-factor authentication and strong passwords. This can ensure that only legitimate and trusted parties can access or use the persistent data in training technology.
- **Data auditing:** audit the collection, storage, processing, transmission, and sharing of persistent data in training technologies using logs, records, or reports. This can monitor and track the data activities and detect any anomalies, errors, or breaches.
- **Data backup:** backup persistent data in training using redundant or distributed systems or networks. This can ensure the availability and recovery of the data in case of system failure or disaster.
- **Data governance:** establish and enforce clear and comprehensive policies, guidelines, and agreements that define the roles, responsibilities, and expectations of the data providers and consumers. This can ensure the transparency, accountability, and fairness of the persistent data.
- **Data education:** educate and train their personnel and stakeholders about the benefits, risks, and best practices of persistent data. This can increase their awareness, understanding, and acceptance of the persistent data.

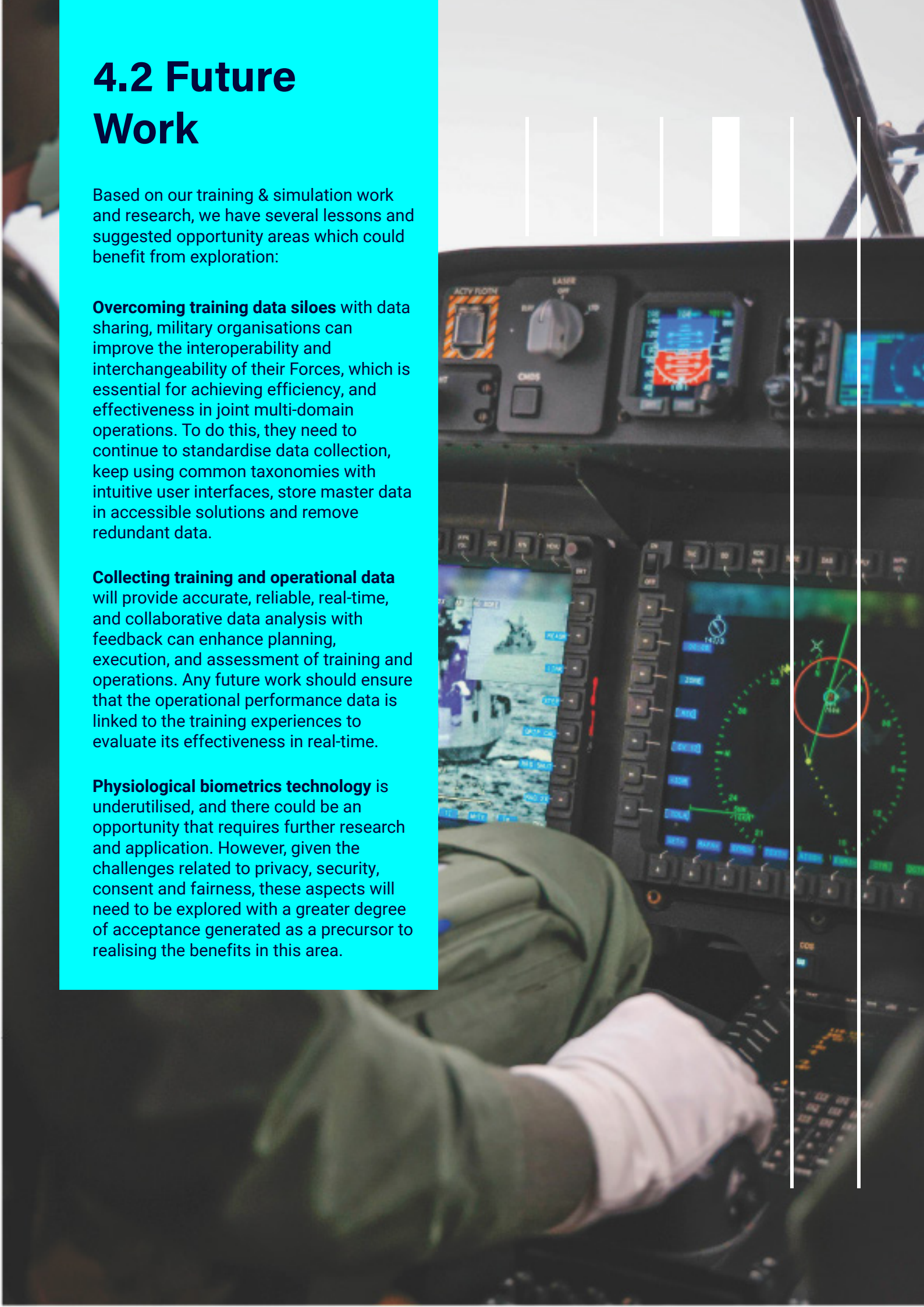
4.2 Future Work

Based on our training & simulation work and research, we have several lessons and suggested opportunity areas which could benefit from exploration:

Overcoming training data siloes with data sharing, military organisations can improve the interoperability and interchangeability of their Forces, which is essential for achieving efficiency, and effectiveness in joint multi-domain operations. To do this, they need to continue to standardise data collection, keep using common taxonomies with intuitive user interfaces, store master data in accessible solutions and remove redundant data.

Collecting training and operational data will provide accurate, reliable, real-time, and collaborative data analysis with feedback can enhance planning, execution, and assessment of training and operations. Any future work should ensure that the operational performance data is linked to the training experiences to evaluate its effectiveness in real-time.

Physiological biometrics technology is underutilised, and there could be an opportunity that requires further research and application. However, given the challenges related to privacy, security, consent and fairness, these aspects will need to be explored with a greater degree of acceptance generated as a precursor to realising the benefits in this area.



5. Conclusion

To realise maximised operational advantage through training and simulation exercises, military organisations need to overcome the challenges of siloed data and data sharing. Implementation of best practices and recommendations can improve the quality, availability, and usability of data to support interoperability and interchangeability. These include adopting common data standards, protocols, and architectures; establishing clear policies, guidelines, and agreements; and employing advanced techniques, tools, and methods.

Whilst exploiting training and operational data can enable operational advantage by providing objective, accurate, reliable, real-time, adaptive, predictive, prescriptive, comparative, and collaborative data analysis, it should be recognised that, military organisations need to protect the rights, interests, and values of members of our military forces and other stakeholders regarding all data gained using modern training technologies. These include data minimization, encryption, authentication, auditing, backup, governance, and education. They must also ensure the effective and ethical use of data management and analytics, including any biometric data that is collected as part of personalised training in modern technology environments.

In a budget constrained world, better management and analysis of data could provide more targeted and effective training (both individual and collective) to be designed and delivered to meet force generation and mission requirements. Technology can be an enabler for paving the journey towards data driven training. However, we recognise that the SOE is only a partial solution to a wider problem. It has been created to target workforce savings and operational gains by enabling training planners to cope with increasing and variable workloads now and in the future considering major new capabilities and courses being created in the next 3-5 years. The system is already providing tangible operational benefits, however further work across the training estate is required to ensure that any replacement or new data and training platforms are connected, well architected, and designed taking into consideration the critical information requirements of the key users to enable data led decision making.

Siloed data, data sharing and data collection are important for training and simulation purposes because they affect the quality, availability, and usability of data that can enhance decision-making, planning, execution, and assessment of training and operations. Interoperability and interchangeability are essential for achieving synergy, efficiency, and effectiveness among allied forces in joint operations or missions. To overcome these challenges, military needs to implement best practices and recommendations that can improve the quality, availability, and usability of data for allied interoperability and interchangeability. These include adopting common data standards, protocols, and architectures; establishing clear policies, guidelines, and agreements; and employing advanced techniques, tools, and methods.

Whilst data collection and its effective use through regulated policies and processes is of organisational importance, the cultural mind shift for data utilisation in the training context requires human centric approach to understand the best use cases as well limitations. Data can be utilised effectively when the purpose of the end goal is clear and linked to strategically important end outcome. The journey to data driven training and operational efficiency is unlikely to be linear with a clear start, middle and end, but more cyclical tied to external macrolevel circumstances, speed and agility required in the training space as well as the level of continuous mindset in the wider ecosystem delivering training, technology and data and operational strategy.

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7. Author/Speaker Biographies

Jim Fox CISM

Business Consultant Manager (Cyber Security) based within Digital Consulting.

Jim formerly served with a UK Fire and Rescue Service prior to joining the Metropolitan Police Service (MPS) as a police officer. While with the MPS Jim operated within SO15 Counter Terrorism Command, where responsibilities included the development and implementation of national counter-terrorism contingency plans and tier one exercises in collaboration with defence and other governmental entities as part of a comprehensive, multi-agency approach, Jim also deployed as a liaison officer to the Royal Air Force during high profile public events (notably the London 2012 Olympic and Commonwealth Games).
Jim has a wealth of experience working with high-ranking government officials, senior officers, and as a public speaker, having participated in numerous conferences and webinars. Additionally, hold the position of committee member within the TechUK National Security Committee.

Membership affiliations include the British Computer Society (MBCS), ISACA, the Security Institute (MSyl), and honorary membership status within the Association of RAF Fighter Control Officers.

N. E. Wiles

Training Advisory Lead – Digital Consulting

Neil is a seasoned professional with significant years of experience in training, training management, and leadership. His career spans across various sectors, with key contributions in both defence and financial services.

Leader and Senior manager for worldwide Electronic Warfare training, to internal and all external clients.

Head of the digitalisation initiatives for all simulation and training activities for the Global training teams.

In the defence sector, Neil has demonstrated expertise in training analysis, delivery, and management. His work has significantly contributed to the efficiency and effectiveness of defence training programs.
Neil's proficiency extends to competency system management and implementation, as well as skills matrix management. These skills have proven invaluable in identifying gaps in team competencies and implementing strategies to address them.

Capita