



Strategic Command

**Integration Design Authority (IDA)**

Achieving An Integrated Force At Home And On Operations, In  
Competition, Crises And Conflict

# The Defence Modelling & Simulation (M&S) Office (DMSO) - Blueprint

Integrated Warfare Centre (IWC)



## Document Purpose

This Defence Modelling & Simulation (M&S) Office (DMSO) Blueprint sets out:

- The purpose of DMSO.
- The strategic goals identified for DMSO to help improve how M&S is acquired, used and developed.
- How it will address those strategic M&S goals.
- A description of DMSO and its major elements.

## Version Control

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## Foreword

1. This DMSO Blueprint describes the approach being taken to cohere Modelling & Simulation (M&S) across the Defence Enterprise.
2. By promoting M&S coherence across Defence and with Allies, without stifling innovation, taking an Off-The-Shelf (OTS) component and data driven approach, DMSO will support Defence's effective use of M&S as a key enabler for many applications and function areas that includes experimentation, T&E, eXtended Reality (XR), training and wargaming through to support to operations.

## Introduction

3. This document sets out the DMSO Strategic Goals, its Vision and the DMSO Functions that have been established as a consequence. Further:
  - a. It lays out a Defence-wide strategy to guide investments in M&S data, tools, services, infrastructure, drive cultural change and workforce development to enable Defence to train, experiment, innovate and collaborate more effectively;
  - b. It recognises the value in having M&S Suitably Qualified and Experienced Personnel (SQEP) appropriate to the post filled by an individual; and
  - c. It acknowledges the importance of a data-driven approach and places value in the use of appropriate models to inform decision-making and is aligned with other Defence and Government data strategies.
4. M&S is a discipline that comprises of the development and/or use of models and simulation(s) (systems) with the following NATO definitions:
  - a. A **Model** is a physical, mathematical or otherwise logical representation of a system, entity, phenomenon, or process.
  - b. A **Simulation** is the execution of a system model over time.
  - c. A **Synthetic Environment** (SE) is a representation of the real world, within which a combination of players may interact.

## M&S Benefits

5. There are many benefits associated with the coherent use of M&S that include (but are not limited to) the following:
  - a. **Military Resources.** Helping to address the limited availability of real-world assets and the reduction in wear and tear on those assets.
  - b. **Security.** The ability to train or experiment behind closed doors out of sight of adversaries.

- c. **Health & Safety.** The ability to test new and current techniques, tactics and training in a safe environment with no risk to life.
- d. **M&S Resources Re-use.** A key tenant of M&S use in Defence is re-use of resource<sup>1</sup> both to avoid unnecessary costs but also to promote interoperability.
- e. **Environmental Impact.** The use of M&S supports Defence's Net Zero initiative by reducing the pollution created by using real world assets.
- f. **Multi Domain Operations (MDO).** M&S creates a unified approach for all elements of Defence to access and use. M&S supports the experimentation of new technologies and allows the exploration of sub-threshold challenges and exploration of complex problem sets.
- g. **Operational Decision Support.** M&S can run faster than real-time allowing 'what-if' scenarios to be run very quickly and therefore enhancing Defence's ability to conduct Course of Action (CoA) analysis.

## Defence M&S Governance

6. Collective governance of M&S-based capabilities across the Defence Enterprise is provided by the 2-star Defence Modelling and Simulation Governance Board (DMA-SGB). Co-chaired by Assistant Chief of Defence Staff (Capability & Force Design) and StratCom Capability Director, the DMA-SGB Objectives and Responsibilities includes the following:
- a. Contribute to the demand signal for Defence M&S-based systems, promoting pan-Defence coherence.
  - b. Monitor the performance of major Defence M&S programme initiatives and identify, cohere and assure risks and issues to delivery and use.
  - c. Identify, prioritise and agree programmatic intervention opportunities to optimise Defence M&S capabilities and ensure that enterprise-wide benefits are realised.
  - d. Provide oversight and endorsement of Departmental M&S policy, enforcing compliance with JSP 939 Defence Policy for M&S thus ensuring that M&S capabilities are developed and delivered in a technically coherent and pan-Defence minded manner.
  - e. Consider and settle any technical coherence or non-compliance issues that cannot be resolved at the DMSO level and, if necessary, escalating to the Military Capability Board (MCB) for a decision in line with its mediation and arbitration process.

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<sup>1</sup> E.g. Data, models and software components.



## DMSO

7. Efforts to bring coherence to Defence M&S date back to 2010 when the Defence Training Systems and Infrastructure (DTSI) programme (Pg) was established following the Strategic Defence and Security Review of that year. In 2012, DTSI was replaced by the Defence Training and Education Capability (DTEC) Pg which was then superseded by the Defence Modelling and Simulation Coherence (DMaSC) approach in 2017 as it became business as usual.

8. DMSO was established in 2022 as a result of an Integrated Review (IR) option, its role is to operate as a cohering force for M&S across Defence. DMSO furthers wider Defence coherence through the delivery of the JSP 939 Defence Policy for M&S. All other DMSO functions enable Defence to deliver against M&S Policy ambition more effectively.

## DMSO Scope

9. The M&S scope within which DMSO operates is defined as:

*“Computer-based M&S that has the intention or potential to be networked or which uses models, data, tools or simulations that might reasonably be re-used in, or used to support, other simulation systems.”*

## DMSO Vision

10. The DMSO Vision is defined as:

*“Maximum M&S capability Pan-Defence through interoperability and exploitation of investment.”*

## DMSO Strategic Goals

11. This section describes 6 Strategic Goals, the achievement of which is necessary to deliver the DMSO Vision and maximise the effectiveness and utility of M&S across Defence.

12. **Goal 1: SQEP.** Getting the right people with the right skills in the right places. Giving Defence the ability to act as an Intelligent Customer and maximise the effectiveness and cost-efficiency of M&S capabilities.

- a. Change the culture. Ensure that developing M&S Knowledge, Skills and Experience (KSE) is seen as valuable to Defence and is not detrimental to individuals' career aspirations.
- b. Improve M&S recruitment and retention.
- c. Make sure the right technical academic courses are available.

- d. Establish an M&S Career Stream.
13. **Goal 2: M&S Policy.** Clear direction with appropriate advice and guidance.
- a. Governs all uses and applications of M&S.
  - b. Is readily available to all – Industry, Academia and Allies alike.
  - c. Provides comprehensive advice and guidance to support the policy.
  - d. Is regularly refreshed to reflect rapidly advancing technology.
14. **Goal 3: Provide Common M&S Enabling Services.** The provision of Defence-wide common M&S tools and services, where prudent.
- a. A M&S resources (including authoritative data) discovery and dissemination service.
  - b. A Synthetic Environment data service.
  - c. A service to provide a Defence-wide COTS virtual simulation.
  - d. Enterprise-licensing of widely used software components.
  - e. Others as appropriate as DMSO evolves.
15. **Goal 4: M&S Technical Coherence.** Follow a common technical approach.
- a. Facilitate provision of impartial technical M&S advice and guidance.
  - b. Promote interoperability across Defence and with Allies, primarily through the use of identified, preferred M&S standards.
  - c. Promote the minimizing of diversity in M&S solutions, tools and architectures (also helping interoperability).
  - d. Using authoritative data (where it is available).
16. **Goal 5: Effective Governance.** Experience shows reliance on guidance alone is not sufficient to ensure the coherence sought is realised.
- a. Assess and Assure M&S Pgs/Pjs against policy.
  - b. Develop a robust proven mechanism for escalation of issues with effective results.
  - c. Provision of clear M&S management direction rather than just strategy.

17. **Goal 6: Outreach & Engagement.** Learning from others and sharing our experiences.

- a. Conduct publicity and comms activities - making as many aware as possible.
- b. Engage with Industry and Academia as we cannot do this alone.
- c. Engage with Allies and Other Government Departments (OGDs) to learn from each other.

## **DMSO Construct**

18. DMSO consists of the following elements:

- a. **The Technical Authority (TA).** The TA is primarily responsible for promoting technical coherence of M&S across Defence and with Allies with a particular focus on re-use, interoperability, and provision of impartial technical M&S advice. To meet this aim, it includes the following:
  - i. **The Defence Simulation Centre (DSC).** The DSC is the front door for all M&S Enquiries. It acts as a hub to enable exploitation, management, and interoperability through the sharing and re-use of M&S resources. It is located within the Defence College for Military Capability Integration (DCMCI) at the Defence Academy.
  - ii. **The Technical Authority Support Team (TAST).** The TAST provides impartial specialist M&S advice and guidance to all Defence. TAST supports the delivery of M&S Assess and Assure (A&A) duties set out in JSP 939.
- b. **Programmes.** Responsible for the successful provision of Defence-wide M&S enabler Pgs being delivered by DMSO.

19. DMSO relies on the following areas that sit outside its Chain of Command but are key stakeholders:

- a. **M&S Service Command Technical Authorities (SCTAs).** Directed by JSP 939, these posts are established in each FLC to undertake Assess and Assure (A&A) duties against policy for all Modelling and Simulation (M&S) projects (Pjs) and Pgs within their Area of Responsibility (AOR).
- b. **The Defence Wargaming, Modelling and Simulation School (DWMSS).** Part of DCMCI at the Defence Academy. Provides education for Defence civilians and all military ranks, at every operational level, on all aspects of simulation, modelling and wargaming.
- c. **The M&S Capability Planning Group (CPG).** Part of UKStratCom Cap C4ISR, the CPG identifies capability gaps and develops the future Strategic Command equipment programme for M&S and Joint Training.



- d. **The Simulation and Synthetic Environment Lab (SSEL).** Located within the DCMCI at the Defence Academy, the SSEL is used to deliver M&S technical academic provision.
- e. **The RAF Chief M&S Officer (CMSO).** Lead for M&S Coherence and Governance within Air.
- f. **Dstl.** Leading Defence M&S S&T activities.
- g. **Defence Digital.** The delivery agency for common M&S enablers.

20. The DMSO DSC, alongside the Defence M&S School and the SSEL, is considered to be the Defence M&S Centre of Excellence.

## Engagement with DMSO

21. Engagement with DMSO begins through the DSC in its role as the centre of focus for all Defence M&S enquiries. The DSC Front Door will accept enquiries from all whether they are from Defence, Industry, Academia, OGDs or Allies via a single internet presence. Such enquiries are triaged with an initial response in a timely manner, passing on the enquiry as appropriate and tracking response. Customer feedback will also be sought and suitable Management Information provided to allow demand and performance to be monitored and managed.

## DMSO Functions

22. Each of the DMSO functions (as can be seen in Figure 1 below) supports the DMSO vision. The remainder of this document articulates the current and planned DMSO activities required to deliver the DMSO functions.

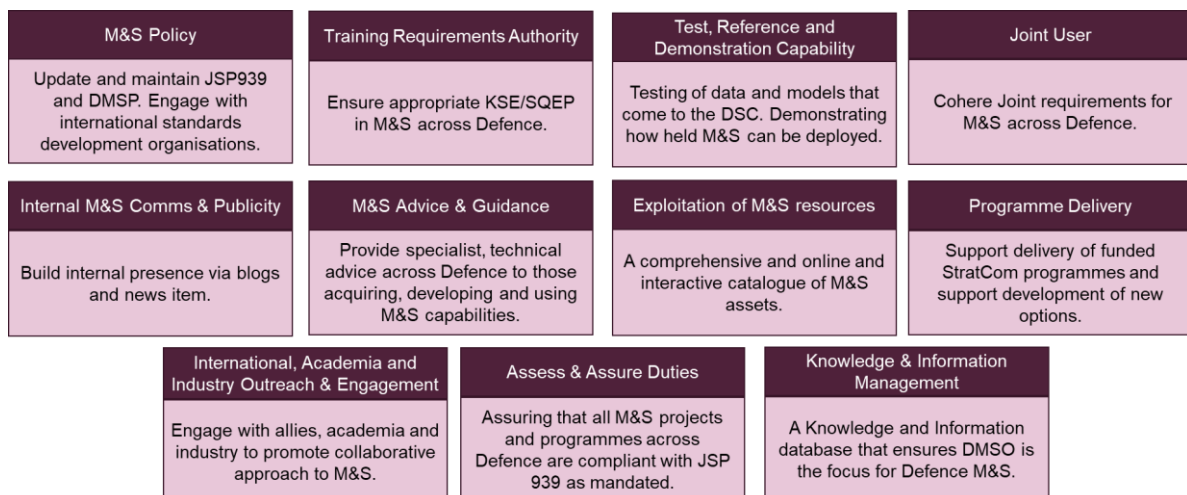


Figure 1 - DMSO Functions

## M&S Policy

23. Under the direction of DCDS (Mil Cap), DMSO maintains and updates policy direction to Defence through the publication of JSP 939 *Defence Policy for Modelling and Simulation (M&S)*<sup>2</sup>. DMSO also maintains the Defence M&S Standards Profile (DMSP)<sup>3</sup> that is designed to further coherence by listing mandated and preferred M&S standards. The DMSP is refreshed annually.

24. Delivery goals include coherence for M&S across Defence, with Other Government Departments (OGDs) and Allies in order to deliver value for money and return on investment for the Defence Enterprise through increased interoperability and re-use of M&S resources. This is affected through engagement with international standards development organisations such as SISO, NATO M&S organisations such as the NATO M&S Group (NMSG), and Industry fora.

25. **JSP 939** Version 3 of JSP 939 was published in Jan 2024 (with an update expected in Jan 2025); it recognises the broad role of M&S across a range of application and focus areas and sets the conditions for wider adoption and coherence. This update has focused on Part 1 (Directive) however it also sets out a template for different application areas in Part 2 (Guidance). This approach will allow guidance for specific application and focus areas to be produced and updated on an on-going basis.

26. Iterative updates of JSP 939 will see guidance updates into each of the application and focus areas for M&S. The TA will work with subject matter experts from across different focus areas to ensure that the policy principles set out in JSP 939 are applied proportionally and appropriately across the different use cases.

27. **DMSP**. Reviewed annually with the assistance of Industry and Academia via the DMSO Industry Advisory Group (DIAG), the creation of Def Stan 03-050 enables the DMSP to be included in M&S delivery contracts.

28. The DMSO TA will continue to work closely with M&S stakeholders to continue to develop JSP 939 and the DMSP.

## M&S Training Requirements Authority (TRA)

29. DMSO owns the role of the Defence M&S TRA supporting the goal to ensure the appropriate Key Skills and Experience (KSE)/SQEP in M&S across Defence, helping to get the right people with the right skills and experience in the right places. A M&S Training Needs Analysis (TNA) has been completed but actions have not yet been taken forwards.

## Current and Planned Activities

30. The M&S TRA is actively engaged with the Defence M&S School to inform the Defence Academy's Technical Academic Provision (TAP) programme contract

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<sup>2</sup> [Defence policy for modelling and simulation \(JSP 939\) - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/publications/defence-policy-for-modelling-and-simulation-jsp-939)

<sup>3</sup> [Defence modelling and simulation standards profile - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/publications/defence-modelling-and-simulation-standards-profile)

renewal. This addresses the expiration of the current contract with Cranfield University in 2028. TAP programme activities will instigate a full review of all the M&S delivered courses to ensure that the demand for M&S SQEP is being met.

31. The TNA outputs are being used to get M&S skills into the Pan Defence Skills Framework (PDSF). In addition, a trawl of all MOD posts that require some form of M&S education will be conducted in order to inform the M&S technical academic courses.

32. In an attempt to help resolve the extant M&S SQEP issues as described in Strategic Goal 1, options to address Defence M&S recruitment and retention matters will be examined.

## **DMSO Test, Reference, and Demonstration Capability (TR&DC)**

### **Description**

33. Managed by the TAST, the TR&DC is a M&S capability (based on COTS hardware and various M&S tools, applications and data), akin to a Virtual Integration Environment that promotes integration at pace. It will provide many benefits to include:

- a. Allowing TAST personnel to continue to develop professionally, building and maintaining their M&S skillset and knowledge.
- b. Testing of data and models that are submitted to the DSC.
- c. Allowing different M&S applications and tools to be tested against others as part of a technical architecture solution.
- d. Allowing M&S applications and tools to be demonstrated to various parties including cap areas and delivery teams.

### **Benefits**

34. It is anticipated that the TR&DC will also provide significant benefit in building industry confidence that Defence can act as an Intelligent Customer at a more expert level. This in turn will assist in the reduction of industry's estimation of risk and therefore reduce proposal costs.

35. The TR&DC will enable Defence and industry partners to research and investigate solutions to their M&S requirement without recourse to buying different equipment or applications.

### **Operation**

36. The TR&DC will work in conjunction with the SSEL at the Defence Academy which has a specific academic focus.

37. The TAST will:
- a. Seek to procure key applications to enable the TR&DC to function effectively.
  - b. Keep track of procurements of simulation capabilities across Defence and identify where they may be placed as Test and Reference Capabilities.
  - c. Develop the necessary knowledge and skills to provide demonstrations as part of the TR&DC.
38. The DSC will engage with the TAST to provide access to the TR&DC as appropriate.

## **Joint User**

39. DMSO acts as the Joint User responsible for establishing and maintaining a unified single voice on M&S-based capabilities and concepts that do not sit with any single Service<sup>4</sup>. The role includes provision of through-life integration and employment advice, and the provision of a joint perspective on capability priorities.

## **Internal Comms and Publicity**

40. A major challenge for DMSO is internal comms, particularly with the high turnover of staff within Defence and the speed in which M&S technology advances. This function therefore attempts to address this function via such items as blogs and news articles.

## **DMSO Advice and Guidance (A&G) Function**

41. The provision of specialist, impartial, technical advice across Defence to those acquiring and using M&S capabilities and resources is the responsibility of the DMSO TAST.

42. A fully staffed TAST will be a proactive organisation with frequent and continuous visits and engagement with M&S programmes and projects across the Defence Enterprise. TAST will provide active support to the SCTAs and manage the Assess and Assure process to ensure there is appropriate coverage and technical oversight of all M&S programmes.

43. The TAST will keep a comprehensive record of engagement for the purposes of information management and the understanding of effectiveness in satisfying demand. Where possible, TAST will seek to provide advice through self-service forums and publishing guidance through a Defence Wiki.

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<sup>4</sup> Once DMSO is fully resourced, this task will need to be fully explored.

44. Over the next 12 months DMSO will look to fill all TAST positions. This will allow the delivery of the A&G function more effectively by:
- a. Continuing to develop the capability of the TAST team through building individual and corporate knowledge of M&S across Defence.
  - b. Engaging with Allies on similar applications and through suitable fora such as I/ITSEC.
  - c. Developing and maintaining a list of PoCs.
  - d. Developing a system or Network that informs DMSO of any new M&S activities in Defence (IDA, DE&S, DD).
  - e. Tracking demand for A&G to inform business decisions.
  - f. Engaging with Industry as appropriate.

## **Exploitation of M&S Resources**

45. A key aim of DMSO is the exploitation of available M&S resources. This necessitates the requirement for a comprehensive, online, interactive catalogue of such resources to include reference information. It will provide discovery and subsequently dissemination services for such resources to support re-use and interoperability. This requirement is being delivered by the DSC Catalogue (DSCC) project.

46. Alongside the delivery of the DSCC, another initiative underway is the generation, maintenance and provision of Synthetic Environment (SE) (GEOINT) data from authoritative sources known at the SE Service (SES).

47. Currently, the DSC hosts a data repository of resources available for re-use. However, these resources are not maintained or accepted in any formal manner (they have not been subjected to any DMSO verification and validation). They include:

- a. Common Terrain data sets and Terrain models.
- b. 3D Models.
- c. Common M&S Applications for which Defence has re-use ability.

48. DMSO facilitates the re-use of M&S resources via the following process:

- a. Receiving requests via the DSC Front Door for models and terrains and acknowledging within 2 working days with a DSC Request for Information Form (RFI) and a relevant Confidentiality Agreement (MOD in-service user or Industry version).

- b. On receipt of the RFI, conduct a triage and place priorities on the demands. Triage considerations will be affected by Repository Server availability, projected size of the task and download capacity. Triage will be conducted twice daily on working days and priorities adjusted if required.
- c. Fulfilling the request either by passing on the request to other authorities or by providing the items from the Repository.

## **M&S Programmes Delivery**

49. DMSO is responsible for the delivery of common StratCom-funded M&S capabilities and services across Defence that do not sit within the purview of a single command or domain. Such programmes are aimed to promote coherence including interoperability and re-use of resources along with targeted economies of scale.

50. The DMSO Programmes Board is chaired by Hd DMSO and aims to provide collective governance of DMSO (M&S) programmes. It has the following Objectives and Responsibilities:

- a. Monitor the performance of DMSO M&S programme initiatives and identify, cohere and assure risks and issues to delivery and use.
- b. Identify, prioritise and agree programmatic intervention opportunities to optimise DMSO programmes and ensure that, where prudent, enterprise-wide benefits are realised.

51. To provide good oversight and governance of these programmes, the DMSO Programme Director will ensure that the following areas are effectively managed for each of the DMSO programmes and projects:

- a. **Budget management.** Ensuring that spending in each programme is within budget as defined by StratCom.
- b. **Timescales.** Keeping programmes on the defined timeline against given milestones. The Programme Director sets time frames for goal completion, including sub-goals building up to the programme's completion.
- c. **Conflict resolution.** Conflict is inevitable in programmes. Swift resolution of conflict is key to converting negative situations into positive outcomes.
- d. **Engagement with Stakeholders.** Stakeholders are key to the success of DMSO programmes. Engaging with Defence-wide stakeholders and, where possible, ensuring that key parties are aware of programmatic activities will help alignment, coherence and co-ordination of such activities.



52. Current DMSO programmes include:
- a. **Defence Synthetic Environment Programme (DSEP).** A programme to deliver common M&S capabilities, services and data pan Defence.
  - b. **Defence Simulation Network (DSN).** Provision of a Defence-wide DSN for FLCs for test and experimentation purposes. DSN is subsumed into the Joint Multi-National Interoperability Assurance Network (JMNIAN) and is described as JMNIAN+.
  - c. **DSC Catalogue (DSCC).** A web-based metadata register for readily available authoritative M&S resources and reference information promoting coherence and re-use.
  - d. **Synthetic Environment Service (SES).** The SES will generate, maintain and make available SE data from authoritative sources.
  - e. **Defence Virtual Simulation (DVS).** DVS provides a COTS-based virtual simulation.
53. **Future Capability Options.** The Programme Director will work with UKStratCom Cap to help identify future M&S capability options and secure funding via StratCom Cap.

## **DMSO Outreach & Engagement (O&E)**

54. DMSO O&E includes engagement with Allies, OGDs, Academia and Industry to support a collaborative and proactive approach to Defence M&S.
55. DMSO provides briefings on key M&S courses and regularly engages in MOD fora (such as the Integrated Warfare Conference). There is an M&S Community of Interest and a capability planning forum that brings together key M&S stakeholders across Defence.
56. External industry engagement is conducted through the DMSO Industry Advisory Group (DIAG) on a quarterly basis. DMSO also regularly engages at international fora such as NMSG, SISO, Computer Assisted Exercise (CAX) Forum and Urban Combat Advanced Training Technology (UCATT) meetings.

## **DMSO A&A Function**

57. The role of the A&A function is ensuring that all M&S based programmes and projects are developed, acquired and operated in accordance with JSP 939. The TAST works with the SCTAs to support them in their A&A duties that are essential to promote coherence for M&S across Defence.
58. A&A duties demand deep technical M&S knowledge such that a pragmatic approach can be taken to avoid stifling innovation. The evaluation of extraordinary proposals and enquiries necessitates the understanding of all potential impacts on

the Defence M&S Ecosystem. The TAST team are expected to support the SCTAs in this respect.

59. Capacity constraints in the TAST team hinder the ability to provide an optimum A&A function across Defence.

60. The A&A process includes the mandated completion of a DMSO Capability Technical Assessment Report (CTAR) and stored in a repository accessible by all in Defence, but its registry is not as comprehensive as desired.

61. The CTAR process is the mechanism through which the application of this direction is assured. All Pgs/Pjs are prompted to start the CTAR process from the outset.

62. Over the next 12 months the TAST team will seek to meet its full complement. This will allow it to support the A&A function more effectively by:

a. Engaging with SCTAs to ensure that JSP 939 principles are being applied and the CTAR process is being followed.

b. Reviewing and overhauling the CTAR process to ensure that it is effective in assuring consistent application of JSP 939 principles, delivers valuable outcomes for Defence, and is not seen as a bureaucratic process that slows down progress.

c. Updating the systems/CTAR register to ensure DMSO has visibility of the range of M&S capabilities and uses across Defence and the level of policy assurance DMSO holds against them.

## **M&S Knowledge & Information Management (KIM) Function**

63. DMSO will establish and maintain a KIM team that sits within the DSC to build and maintain corporate M&S knowledge and help manage communications.

64. This corporate M&S knowledge will include (but not be limited to):

- a. Points of Contact;
- b. A register of M&S-related assets;
- c. Official reports and research; etc
- d. A Communications Plan.

65. The KIM team will manage the DMSO SharePoint Site and any direct DMSO web presence to include the intranet and internet. It will support the O&E function to provide suitable communications.

66. Once established, this KIM team is to:

- a. Manage a M&S KIM database.

- b. Build internal MODNet media presence via blogs and news items.
- c. Build internal and external media presence via appropriate available means.