



MINISTRY OF DEFENCE

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VOLUME 7 INTEGRATED LOGISTIC SUPPORT

PART 9 SUPPORTABILITY CASE

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CHAPTER 1 - POLICY

CONTEXT

1. This part provides key points of policy and guidance in the production of an ILS Supportability Case.

DEFINITION – SUPPORTABILITY CASE

2. The Supportability Case is defined as: “A reasoned, auditable argument created to support the contention that a defined system will satisfy the Support requirements of a Project”. Starting with the initial statement of requirement, it will subsequently include identified perceived and actual risks, strategies and an Evidence Framework referring to associated and supporting information, including Support related evidence and data from design activities, trials, etc, through to In-Service and field data as appropriate and also record any changes.

3. It will, thus, manifest itself as a top-level control document, updated periodically through the issue of Supportability Case Reports linked to the Evidence Framework; it will record progress and remain with the equipment / system throughout its life until disposal.

4. The Supportability Case is, therefore, a progressively expanding body of evidence whose currency and relevance shall be maintained in order to inform the Through Life Management decisions for the Project.

POLICY

5. It is MOD policy that a Supportability Case be produced concurrently with the planning and conduct of ILS activities. It is recognised that the supportability case will need to match the tailored ILS solution.

PRECEDENCE AND AUTHORITY

6. The authority to apply the discipline of ILS including the concurrent production of a Supportability Case is promulgated from DE&S Corporate Governance Portal Index.

MANDATED REQUIREMENTS

7. It is a requirement that all systems and equipments have a Supportability Case.

ASSURANCE

8. The ILS Supportability Case will form part of the wider project assurance framework. The details for assurance of ILS are provided within the Support Solutions Envelope (SSE) KSA 2, primarily within Governing Policy 2.1.

9. The Supportability Case may be used to populate the SSE compliance tool.

10. The procedures to be followed when producing a Supportability Case are detailed in Chapter 2 and additional guidance is contained within Chapter 3.

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KEY PRINCIPLES

11. The key principles are:

- a. ILS requirements for the system shall be determined and demonstrated to be understood by both the Authority and Contractor.
- b. A programme of activities shall be developed and implemented to satisfy the identified ILS requirements.
- c. The authority shall undertake the progressive production of a Supportability Case to demonstrate that the ILS requirements are being met, and risks associated with the requirements are being managed.
- d. The Supportability Case shall be applied through life from concept to disposal for new projects; existing projects may adopt the supportability case at the project manager's discretion.

ASSOCIATED STANDARDS AND GUIDANCE

12. The following standards have been employed on ILS programmes within the UK MOD:

- a. Def-Stan 00-60.
- b. Def-Stan 00-600.
- c. Mil Std 1388-1a/2a/2b.

OWNERSHIP

13. The policy for Test Equipment is sponsored by DES JSC SCM-EngTLS-PEng.

POINTS OF CONTACT

14. The Points of Contact for enquiries concerning this document are as follows:

- a. For enquiries concerning the technical content, to the policy Sponsor:

DES JSC SCM-EngTLS-PC2
Cedar 2A, #3239, MOD Abbey Wood, BRISTOL BS34 8JH
Tel: Mil: 9679 Ext 82689, Civ: 030679 82689.
- b. For enquiries regarding the accessibility and presentation of the document to:

DES JSC SCM-SCPol Editorial Team
Cedar 1A, #3139, MOD Abbey Wood, BRISTOL BS34 8JH
Tel: Mil: 9679 Ext 82699, Civ: 030679 82699.

CHAPTER 2 - SUPPORTABILITY CASE PROCEDURE

DEFINITIONS

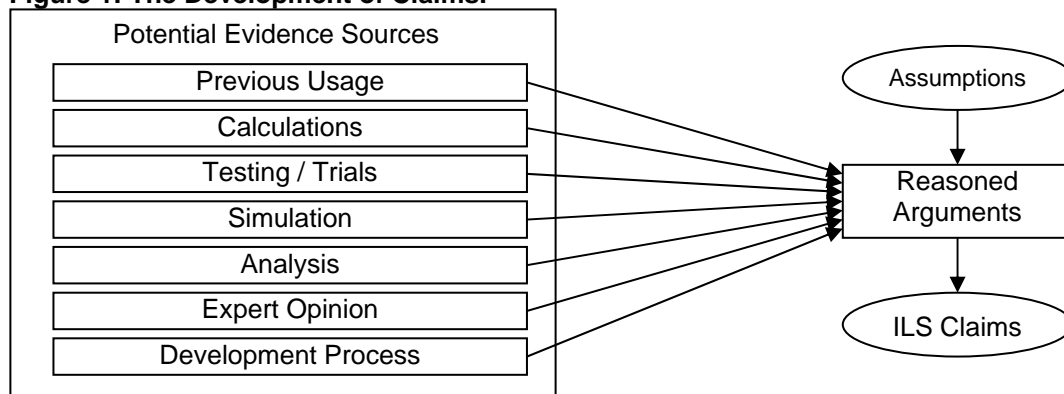
1. **Supportability Case Report.** Supportability Case Reports are periodic updates to the Supportability Case (usually at predetermined points in the programme (e.g. Support Assurance Reviews) as agreed in the Evidence Framework. They report on the evidence, arguments and conclusions drawn from work since the last report (referring out to papers and data sources where necessary), provide an assessment of overall Support related achievement / progress and a review and evaluation of the ILS Strategy and Plan.
2. **Supportability Evidence Framework.** The Supportability Evidence Framework is a matrix of Support related risks, requirements for evidence to mitigate the risks, activities necessary to obtain the required evidence, the evidence acceptance criteria, references to the evidence actually provided and confirmation of its acceptance (or rejection). It provides traceability of the Supportability Case process through the life of the system. It is equally applicable to the Authority and Contractor's risks and is typically presented in the form of a matrix.
3. **Supported System.** A System is defined as "a combination of physical components, software, procedures and human resources organised to deliver a military capability". This is true for both 'Equipment' and 'Support' Systems and the Supportability Case will address the Support related elements of both.

THE PRINCIPLES OF THE SUPPORTABILITY CASE

Introduction

4. The Supportability Case is a reasoned, auditable argument created to support the contention that a defined Support System satisfies the Support requirements of the equipment; the Supportability Case provides an audit trail of the logistic engineering considerations from requirements through to evidence of compliance. It provides the traceability of why certain activities have been undertaken and how they can be judged as successful. It is initiated at the concept stage, revised progressively during a system life cycle and will typically be summarised in Supportability Case Reports at predefined milestones. Figure 1 below, illustrates the concept of building and arguing claims in the Supportability Case using the evidence sources.

Figure 1: The Development of Claims.



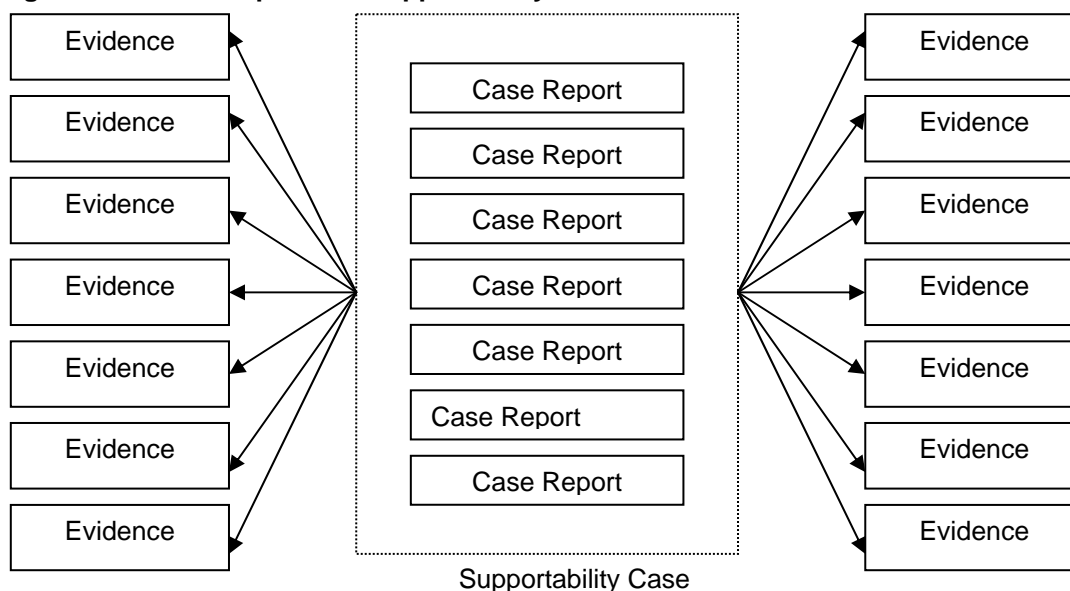
5. In practice, the collation of all documentation is likely to be unmanageable, particularly where there are many and diverse sources of evidence. An acceptable

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solution is to form the Supportability Case out of the Supportability Case Reports, which in turn refer out to source evidence. This is illustrated in Figure 2 below.

6. All the analyses, strategies, plans, evidence, assumptions, arguments and claims that make up the Supportability Case are to be found within the boundary indicated by the dotted line.

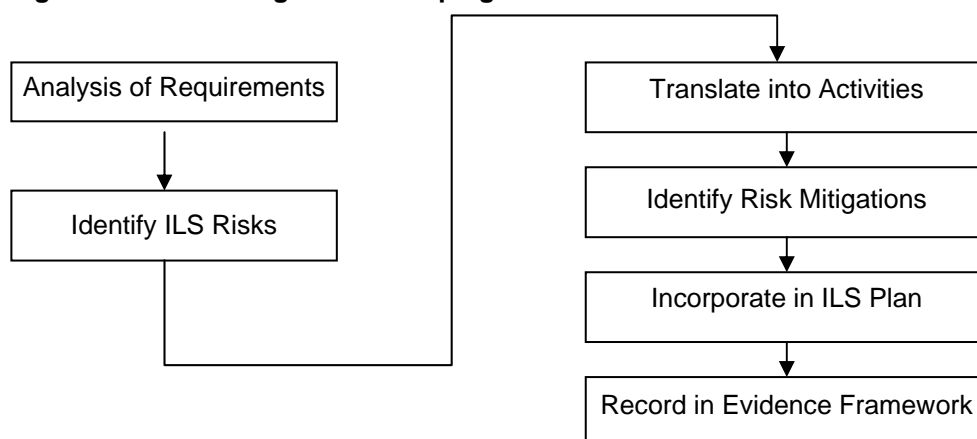
Figure 2: The Concept of the Supportability Case



7. The Supportability Evidence Framework captures the current set of mitigation activities (and their success criteria) to address the Support related risks. It will typically be presented in the form of a matrix.

8. The number, content, objectives and timescales of the Supportability Case Reports are determined and prescribed by the Evidence Framework. This starts with the initial work on the ILS Strategy & Plan and is updated throughout the project. Each Supportability Case Report will reflect the latest state of the Evidence Framework. This is illustrated in Figure 3. This element of the Supportability Case will contain details of the initial (justified) Support related requirements and reasons for proposed solutions.

Figure 3: Establishing and Developing the Evidence Framework



ILS / Supportability Engineering Strategy Overview

9. All projects are to have and maintain an over arching ILS / Supportability Engineering strategy in the Supportability Case. This must ensure that the capability being procured has the required Support characteristics through out its life.
10. The strategy shall detail how the Supportability related characteristics of both the Equipment and the Support System will continue to be monitored in Service.
11. The Authority must determine the Support related requirements and their measurement base. The Support related requirements should include the anticipated Support system environments and constraints.
12. In the absence of specific direction from the Authority, the onus will be on the Contractor to take the initiative and propose Support related design targets and measurement base.
13. Through analysis of the Support related requirements, the Contractor shall decide upon a robust design philosophy for the eventual Equipment and Support System solutions. The consideration of the risks to achievement of the Support related requirements will result in a strategy for managing the risks and delivering the necessary assurance / ensurance. The programme of activities must include verification and feedback to review the ILS / Supportability Engineering Strategy and Plan in the light of achievements.
14. The details of how this strategy will be implemented are discussed in JSP 886 Volume 7 Part 2 - ILS Management.

Supportability Case Review

15. The Supportability Case must be reviewed and updated if:
 - a. The Equipment or elements of the Support system are modified.
 - b. There are changes in how or where the system is used or supported, for example, changes to extant Support or Contracting policies.
 - c. There are changes in the Support related requirements.
 - d. There is a deviation between actual performance and design intention.

THE APPLICATION OF THE SUPPORTABILITY CASE THROUGH THE SYSTEM LIFE CYCLE

Introduction

16. The production of a Supportability Case must be undertaken as a dedicated activity within the organisation developing the equipment and its associated support system. The process involved interfaces with two other concurrent activities that are necessary in any well executed project, namely:
 - a. The production of Operating Centre assurance.
 - b. The production of a Reliability & Maintainability case.

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17. Each of these activities will have a major review at the following major decision points:

- a. Initial Gate (IG).
- b. Main Gate (MG).
- c. Logistic Support Date (LSD) review.
- d. In Service Review (ISR).

18. A common risk based approach will be adopted in the conduct of all the above activities, with the effort expended to gather the evidence necessary for each of the processes harmonised as much as possible.

19. The balance of effort required between the Authority and Contractor in the production of the Supportability Case will depend primarily upon the broad support solution approach selected from the Equipment Support Continuous Improvement Team (ESCIT) Support Options Matrix and the type of project Developmental or Non Developmental.

INITIAL GATE / PRE CONTRACT AWARD SUPPORTABILITY CASE

MOD Responsibilities

20. Prior to initial gate the majority of activity will be undertaken by the Authority. It is vital that support requirements are identified and accurately quantified as early as possible in the system lifecycle.

21. The project will need to accurately capture the support requirements and their measurement base. It is vital that a Use Study is produced in conjunction with the users of the system that reflects how the system is likely to be used in service.

22. It is important to capture any support related risks at this point and include them in the project risk register.

23. The Supportability Case will be closely coupled with the formal SSE assurance process at this point.

Contractor Responsibilities

24. There is unlikely to be any significant Contractor activity at this stage.

MAIN GATE

MOD Responsibilities

25. At main gate the Supportability Case shall contain a partially completed evidence / Acceptance framework consisting of the proposed ILS activities, their success criteria and the project milestones at which this evidence would be produced.

26. The Supportability Case will be closely coupled with the formal SSE assurance process at this point.

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POST CONTRACT AWARD SUPPORTABILITY CASE

Post Tender Award

27. Post tender award, the Supportability Case will need to be revisited to ensure that the contractable requirements have been accurately captured and evidence gathered to support any activities that close the gap.

Contractor Responsibilities

28. The basis for the generation of the Supportability Case and the underlying evidence framework will need to be agreed by the Contractor.

LOGISTICS SUPPORT DATE SUPPORTABILITY CASE

29. The Logistic Support date is a significant milestone in the project calendar. It is at this point that the Supportability Case shall contain sufficient evidence to show the ILS objectives of the project up to In-Service have been met and those that have not but will be achieved during the In-Service phase with the requisite confidence.

IN SERVICE SUPPORTABILITY CASE

30. Once the equipment enters into service it is important that the operation of the support system is carefully monitored. The actual performance of the equipment and its associated support system must be accurately recorded.

31. In addition it is important to record any changes in the way the equipment is operated and the environment that it is operated in. Risks to support must be identified and incorporated into the project risk register.

32. An effective Data \ Defect Reporting and Corrective Action Systems (DRACAS) will need to be implemented to monitor the performance of the equipment and effect changes to the support system as necessary to maintain the supportability requirements.

MODIFICATIONS

33. Equipment may need to be modified during its life to meet a changing military need or to overcome obsolescence issues with the original design. Any changes to the underlying design will need to be analysed for their impact upon the support system to ensure that the support system requirements are being met. Evidence will need to be captured that the changes to the equipment and or support system are still meeting the supportability requirements.

PROGRESSIVE ASSURANCE OF ILS

34. In every project there is potential for shortfalls in the support system performance. The identification of ILS risks shall prompt the adoption of mitigation activities by the project to minimise their impact.

35. The risk of not achieving ILS requirements shall be evaluated and managed by the application of risk management practice. This conventionally involves scoring each risk against a set of criteria defined at the start of the project. The risk management process will start at the assessment stage with the identification of risks and continue through the CADMID cycle until the disposal phase. The assurance process will need to be an active

process that will react to changing levels of risk and the emergence of new risks as the project progresses.

36. It must be recognised that the ILS risks in a programme do not always decrease throughout the lifecycle. There will be occasions where the selection of a different design option, technology insertion or mid life upgrade will render parts of the Supportability Case obsolete and fresh evidence will need to be gathered accordingly.

CHAPTER 3 GENERAL REQUIREMENTS

GENERAL REQUIREMENTS FOR SUPPORTABILITY CASES AND SUPPORTABILITY CASE SUMMARY REPORTS.

Providing the Evidence

1. Throughout the contract the Supportability Case should bring together all forms of evidence not just the traditional LSAR data and the DID specified items.
2. These forms of evidence may typically include:
 - a. ILS plan.
 - b. LSA plan.
 - c. ILS Element Plans.
 - (1) Tech Docs.
 - (2) PHS&T.
 - (3) Supply Support.
 - d. Training Plan.
 - (1) TNA.
 - e. Design Calculations.
 - (1) FMEA.
 - (2) FMECA.
 - f. Performance in previous usage.
 - g. Subject matter Expert Opinion.
 - h. Testing Results.
 - (1) Reliability Tests.
 - (2) Maintainability Tests.
 - i. Modelling / Simulation Results.
 - (1) Cost Models.
 - (2) Reliability Models.
 - (3) LORA Models.
 - j. Design R&M cases.

3. At post contract award, both functional and physical logistic support activities will be conducted to develop the support solution. Little of this activity will be specifically geared towards the production of evidence for a Supportability Case and the evidence will need to be extracted from material required for wider logistic engineering aims.
4. As progress is made through CADMID cycle, evidence will be generated, gathered and evaluated in a series of Supportability Case reports, such that at appropriate points up until the end of the contract, that the supportability requirements have been met.
5. Figure 4 shows how the reasoned arguments in the Supportability Case can combine different types of evidence and be based upon assumptions. It is important that these assumptions shall be declared openly and as soon as possible within the system lifecycle. They should be included on the Master Data and Assumptions List if the project has implemented one.
6. The assumptions shall be validated at the earliest opportunity and thus effectively replace the assumption with evidence.
7. The reasoned arguments enable claims to be made about the expected ILS performance and these claims with the associated evidence form the Supportability Case.

Guidance on Presenting the Evidence

8. This section provides guidance on how to structure and present the evidence in the Supportability Case. The evidence provided in a Supportability Case will vary significantly from project to project depending on the type of support solution selected from the Support Options Matrix (SOM) and the complexity of the project.
9. Before undertaking a logistics support activity it is essential that the objective of the activity is fully understood and the criteria for success defined. The success criteria must substantiate a claim in the Supportability Case report. Ideally the success criteria will be quantitative in nature; however some activities do not naturally lend themselves to this and will need agreed qualitative criteria.
10. Not all ILS analysis techniques such as Fault Tree Analysis (FTA) will in themselves generate evidence of supportability directly without the addition of activities to influence the design of the equipment or support solution.
11. At certain stages of the project lifecycle, several equipment solutions and associated support solutions may be under consideration. The Supportability Case will need to address each combination separately.
12. The input to the Supportability Case from an activity can be considered to include the following parts:
 - a. Objective and success criteria.
 - b. Outputs.
 - c. Assumptions.
 - d. Evidence.
 - e. Development and maintenance of evidence.

Guidance on How to Assess the Adequacy of Evidence

13. The adequacy of evidence is primarily related to the reduction of ILS risks. Whilst it is not necessary to address the adequacy of ILS tasks in their own right, the visibility, traceability and quality of evidence produced are crucial factors. It is therefore necessary to confirm that the evidence is generated, managed, validated and used within a closed loop system of ILS practices and controls.

14. Figure 4 illustrates a representative closed loop system and comprises 4 main sections from left to right. The left hand section reiterates the principle objectives of ILS. These represent the highest level of criteria for the adequacy of evidence and need to be borne in mind as key objectives, throughout the risk reduction process.

15. The ILS processes which require assurance are high level objective orientated processes that rely upon traditional ILS techniques. The processes exchange information between themselves and external processes. The system is set up as a closed loop with the objective of reducing the impact of ILS risks. The ILS assurance outputs are shown on the right hand side of Figure 4 including the ILS risk register (a subset of the project risk register), the ILS Supportability Case and an assessment of the adequacy of evidence provided.

16. The ILS risk reduction process is applicable at any stage of the lifecycle and to any type of contractual arrangement. The order and degree to which the activities identified within Figure 4 are applied will differ depending on the type of contract and the equipment or capability being procured.

17. In an ideal situation the practices of generating and collating evidence and DRACAS / In-Service feedback should be ongoing, spanning different generations and versions of similar systems.

18. The principle criteria for assessing the adequacy of evidence are therefore as follows:

- a. The evidence as a whole is clearly derived from a closed loop ILS management and risk reduction process such as illustrated in Figure 4.
- b. The origin of any specific item of evidence is unambiguously linked to specific ILS practices and / or control processes.
- c. The links between any specific item of evidence and the ILS Strategy, Plan and Risk Register are shown.
- d. The evidence from any particular ILS activity conforms to the requirements for presentation of evidence.
- e. The status of each item of evidence, in terms of its relevance, completeness, accuracy and how it has been used to influence the system and reduce risk can be readily identified in the evidence framework.

19. In order to assess the adequacy of evidence, auditable methods, techniques, assumptions and detailed results will be sought. Consequently, an open, honest dialogue between partners will be of high importance. Judgement will be required to assess the evidence presented, including its visibility, traceability and quality in accordance with the above listed criteria.

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Figure 4: Closed Loop Process

